AVIATION WEEK

A McGRAW-HILL PUBLICATION

JUNE 5, 1950

Bob Bridge at Salt Lake City knows!

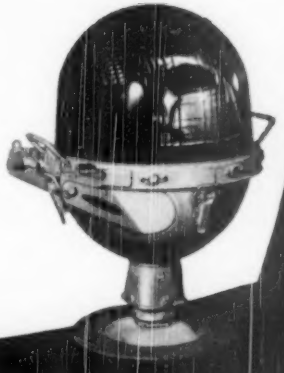
"It's quite a drop onto our runway off the Wasatch Range back of us." Mr. Bridge tells us, "and the mountains send down a lot of heavy weather. So our high intensity runway lights are extremely important. Our air-lines and pilots like them, and I wouldn't want to run an airport without them!"

ask the men who KNOW L-M high intensity runway lighting!

Airport managers, airline men, and pilots who use and know L-M High Intensity Runway Lighting can tell you, from their own experience, and from situations that they personally have observed, how important it is to have good lighting to delineate the runways in good weather or bad. Ask some of the men who know. Then ask the L-M Field Engineer for details, or write Airport Lighting Division, Line Material Co., Shreveport, Pennsylvania (a McGraw Electric Company division).

Larry Hammond at Wold-Chamberlain knows!

Mr. L. D. Hammond, Manager of Minneapolis-St. Paul's famous international airport, has lots of weather—all kinds. He says: "We installed high intensity runway lights with controllable beam because they give maximum penetration of snow and other close-to-minimum conditions. Two years of actual experience, backed by pilots' testimonials, have proved that our L-M Intensity lights have saved lives on several occasions and are an indispensable aid to GCA and ILS under extreme weather conditions. Contracts have been let to install these lights on two more runways!"



LM

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These leading U. S. Air Force *PENETRATORS* are *POWERED* by Westinghouse

Being penetrators, these planes must carry out tactical missions deep into enemy territory. To provide the required fuel economy and dependability, Westinghouse J-34 turbojets have been chosen for their power plants.

Westinghouse is constantly striving for improvement in jet propulsion . . . to provide only the best for the United States armed forces it is privileged to serve.

J-54002-B

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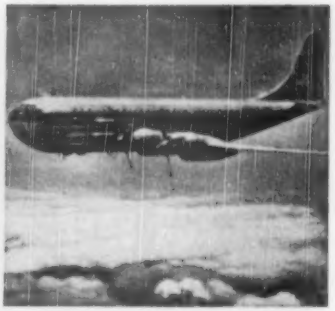
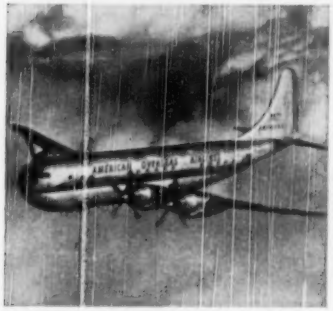
AVIATION GAS TURBINES





How 5 airlines land the big ones

BOEING STRATOCRUISERS now fly the colors of five major airlines—Pan American World Airways, Northwest Airlines, American Overseas Airlines, British Overseas Airways Corporation, and United Air Lines. The total number of Stratocruisers used by these lines is well over fifty. And on every one of them, the main wheel assembly and nose wheel assembly are completely B. F. Goodrich—wheels, brakes, tires, and tubes.

As a result, landing these big fellows is easier, safer, and cheaper. The new-design BFG Expander Tube brakes used in the Stratocruiser respond smoothly, powerfully to minimum pressure. They cannot lock or grab. They take emergency overloads better.

B. F. Goodrich brakes also help the airlines cut maintenance costs. Many parts found in other brakes are eliminated. Relining can be handled with a screwdriver and wrench. And because the expander tube braking action covers a full circle, the load is better distributed; wear is slower and spread more evenly.

B. F. Goodrich assemblies—wheel, brake, tire and tube—offer special advantages for military and private planes as well as airliners. Standard assemblies are available for quick delivery and a new assembly can be engineered for any aircraft design on your drawing boards. Write *The B. F. Goodrich Co., Aeronautical Division, Akron, Ohio.*

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ROEBLING LOCK-CLAD AIRCORD has a damping action that practically abolishes surge and brings easiest, uniform control. But more than that, Lock-Clad gives *safer* control, too. It is made up of a multiplicity of wires and strands . . . has no danger point like the "weakest link" . . . every inch has the dependability and reserve strength that comes from numbers.

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Roebling Lock-Clad consists of a duralumin tube swaged over a Preformed Aircord. This construction minimizes stretch due to thermal change and, also, has AE values three to four times higher than bare controls. This permits use of smaller controls, pulleys and supporting fixtures, and saves weight. The smooth surface fits snugly through pressurized cabin stuffing boxes.

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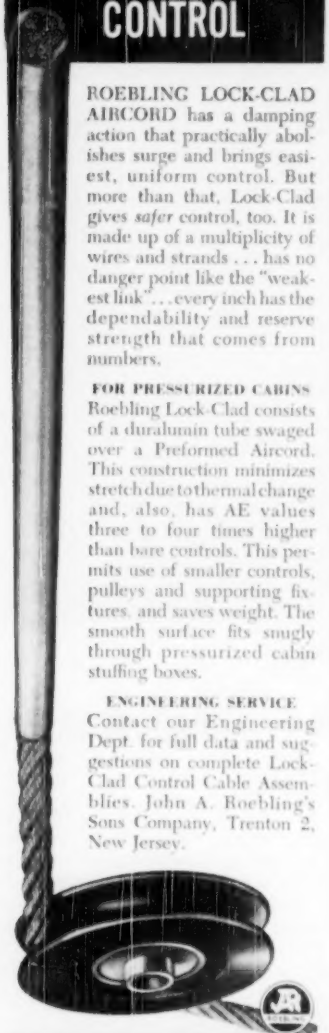
Contact our Engineering Dept. for full data and suggestions on complete Lock-Clad Control Cable Assemblies. John A. Roebling's Sons Company, Trenton 2, New Jersey.



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Aviation Week

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Marie Adams.....Editorial Assistant
Scott H. Reiniger.....Editorial Assistant
Victoria Giaculli.....Editorial Assistant
Erwin J. Bulban.....Editorial Assistant

Thomas M. Self.....Los Angeles Correspondent

Executive and Editorial Offices: 330 West 42nd St., New York 18, N. Y., Phone Longacre 4-3035; National Press Bldg., Washington 4, D. C., Phone National 3414.

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Mid-Continent Airlines, serving the great cities of the Central Plain from the Dakotas and Minnesota to Texas and Louisiana, is the 13th major airline to improve its service by operating the Convair-Liner. More than 1,250,000,000 passenger miles of world-wide transport service by Convair-Liners have proved that, for operational economy, ease of maintenance and over-all top performance, the Convair-Liner has no equal in the twin-engine commercial transport field.
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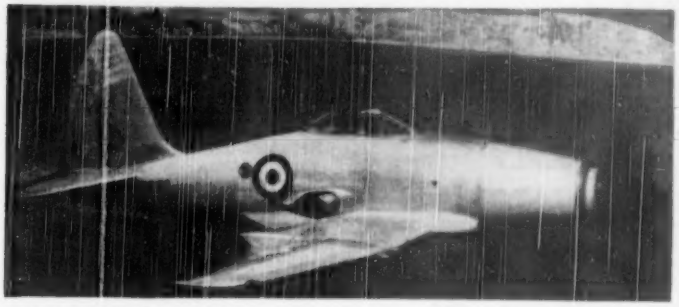
Missiles and Planes In the News



WESTLAND WYVERN T.F. 2, single-seat turboprop fighter in a new flight view.

GRUMMAN AF, claimed to be largest single-engine plane flying, has sub-seeking radar.

TOP SERGEANT XA-5 pulsejet copter has 33-ft. rotor turned by engines at tips.

ITALIAN TRAINER, Ambrosini S.7, is planned to prepare pilots for jet planes.

NIKE, rocket-powered army anti-aircraft missile, has four-finned booster rocket on tail.

TARZON, Bell Aircraft Corp.'s 12,000-lb. bomb, can be guided during descent by electronic commands from bombardier.

The New

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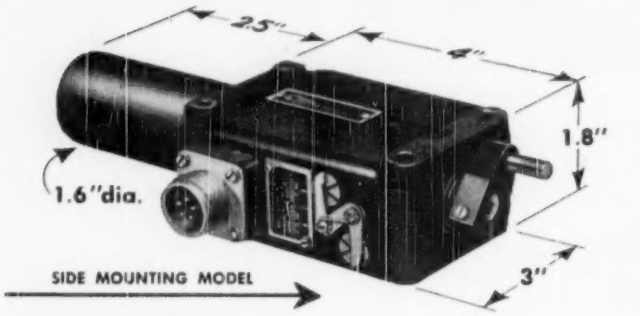
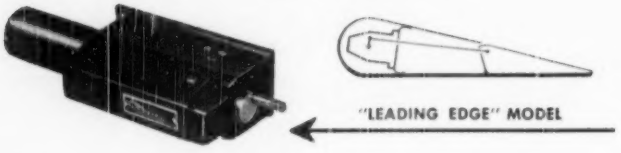
ELECTRIC ROTARY ACTUATOR





★ Two Mounting Styles. Side mounting model for general purpose and "Leading Edge" mounting model for Trim-Tab applications. See above.

★ Compact Size. Dimensions above.

★ Weight 2.25 pounds.

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★ Operating Load Capacity 350 in. lbs. (Standard Ratio)

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WRITE FOR BULLETIN 111

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AVIATION CALENDAR

June 8—Pratt & Whitney distributor operation and maintenance meeting, Airwork Corp., Millville, N. J.

June 10-13—National Aeronautics Assn., annual convention, Hotel Statler, St. Louis, Mo.

June 10-25—International aero exhibition, Centenary Palace, Brussels, Belgium.

June 12-14—Mid-year meeting of Aviation Distributors and Manufacturers Assn., La Salle Hotel, Chicago.

June 12-16—Conference on costs, budgeting and economics of industrial research, department of industrial research, Columbia University, New York.

June 12-16—AIEE summer and Pacific general meeting, Huntington Hotel, Pasadena, Calif.

June 21-25—Ninety-Nines 1950 convention, Ft. Clark Guest Ranch, Brackettville, Tex.

June 26-30—53rd annual meeting, American Society for Testing Materials, ninth exhibit of testing apparatus and related equipment, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 29-July 1—1950 national meeting of Institute of Navigation, San Diego, Calif.

July 7-8—Royal Air Force 1950 display, Farnborough airfield, England.

July 10-28—Air Age Institute lecture series, Parks Air College, E. St. Louis, Ill.

July 12-14—Annual summer meeting of the Institute of Aeronautical Sciences, western headquarters building, Los Angeles.

July 16—Third efficiency race and air show, sponsored by Mansfield Aviation Club, Inc., Mansfield, O.

July 21-23—9th annual all-Ohio air tour, sponsored by Cleveland Junior Chamber of Commerce.

July 30-Aug. 13—17th National Soaring Contest, Grand Prairie, Tex.

Aug. 2-13—17th National Soaring Contest, Grand Prairie, Texas.

Aug. 7-18—Special two-week program on high temperature ceramics, Massachusetts Institute of Technology, Cambridge, Mass.

Aug. 19-20—California Air Freight Clinic, sponsored by Calif. Aeronautics Commission and Oakland Chamber of Commerce Aviation Committee, Oakland.

Sept. 2-4—National Air Races, Cleveland.

Sept. 5-10—Eleventh flying display and exhibition, Society of British Aircraft Constructors, Farnborough airfield, England.

Sept. 7—Pratt & Whitney distributor operation and maintenance meeting, Pacific Airmotive Corp., Linden, N. J.

Sept. 18-22—Fifth national instrument conference and exhibit. Memorial Auditorium, Buffalo, N. Y.

Oct. 26-27—5th annual aviation conference, sponsored by aviation committee of Tucson Chamber of Commerce.

PICTURE CREDITS

7—(upper left) McGraw-Hill World News; Grumman; (lower right) Bell; 12—Consolidated Vultee; 14—Northrop Aircraft; 15—Percival Aircraft; 16 (lower left) Gordon Vincent; 36—Sikorsky Aircraft; 47—Beech Aircraft.

NEWS DIGEST

DOMESTIC

Western Air Lines, last week was to take back the DC-4s it leased to Western Air Lines of California to operate intrastate coach service between Los Angeles-San Francisco area. Reason: WALC had served its purpose, staking out coach service in the name of "Western" until WAL could get permission to operate skycoach. Result: The end of WALC.

Decision is near on PAA-AOA merger. Unless CAB and the White House complete action by June 13, a further extension of the sale agreement will be necessary. By last week, CAB members had scattered to various points, to be gone for as long as three weeks. Doxesters were sure that meant CAB's work on the case had ended.

Record flights: TWA, 77 adults, 32 children under two, 5 crew, in a regularly scheduled aircoach from Chicago to New York. North American Aviation, F-86, Sabre, 32 min., 56 sec. for 341-mi. run between San Francisco and Los Angeles; average speed, 625 mph.

Lockheed F94-A crash at Wright Field was believed due to high altitude flameout. Jet night fighter was powered by Allison J-33 with a Solar afterburner. Pilot apparently was unable to re-light the engine after the flameout. Both crewmen were killed.

Constellation Skycoach service of TWA had an 89 percent load factor during the first few days of service (which started May 26). Inaugural flight eastbound from Los Angeles had all 81 seats sold, and a DC-4 extra section had to be added to carry a 51-passenger overflow. Westbound flight carried 75.

Delta Air Lines has asked CAB permission to use 64-passenger DC-6s on its Chicago-Miami coach service, replacing high-density DC-4s.

New labor agreement has been signed by Boeing Airplane Co. and Aero Mechanics Union which staged a five-month strike in 1948. Wage scales are unchanged, but union was granted other benefits equivalent to about five cents an hour. This is the first contract since the strike.

Special VHF radio channel for use of private planes at uncontrolled airports will be investigated by the Radio Technical Commission for Aeronautics. Sponsors: Aircraft Owners & Pilots Assn.; Michigan Aviation Authorities. Purpose: Exchange of weather information and landing conditions between field and pilot. Power would be five-ten watts, low enough not to create interference with other stations.

Abraham M. Babitch, development engineer in charge of fuel pump engineering at AC Spark Plug division of General Motors, died in St. Joseph's Hospital, Flint, Mich.

Pratt & Whitney div., United Aircraft Corp., has been awarded Navy contracts totaling $51,047,418 for Wasp Major R-4360 engines. Hamilton Standard div. got $2,668,198 in contracts for propeller assemblies.

INTERNATIONAL

Fare increase of 7 percent goes into effect for North Atlantic airlines on Sept. 30, provided governments back up members of the International Air Transport Assn., which decided on the boost at a traffic conference in Madrid. New basic one-way New York-London fare will be $375 instead of $350. There will still be a 10 percent round-trip deduction. Other IATA-fare decisions: Off-season fare of one and one-third times basic fare; continuance of 15-day, roundtrip at fare-and-one-tenth from Jan.–Mar., 1951; 10 percent discount in slower, less-comfortable planes making frequent stops in Mediterranean and Middle East areas.

Records: Air France, world's speed mark westbound Paris-New York, 13 hr., 50 min. flight with Constellation 749A carrying 13 passengers, piloted by Capt. Georges Libert. American Overseas Airlines, nonstop, Shannon-New York, 11 hr., 37 min. in Stratocruiser piloted by Capt. Edward A. Stewart.

Crash of Columbian Airline, Lansa, plane reportedly killed 28.

Single International Standard for certificates of airworthiness for transport planes is expected to be indorsed in principle by the International Civil Aviation Organization during its current session. Standard would include jets. Target date for adoption is 1951. Standards likely will be close to U. S. requirements.

Vickers-Armstrong is sending a Valetta (bombardier trainer) and attacker (jet fighter) on demonstration tour to Italy and the Middle East.

for faster construction of faster planes

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One Example: Shell's PLANNED UPGRADING of aircraft fuels and lubricants . . .

PLANNED UPGRADING of fuels is shown in the new *Shell 80/87 octane fuel.* This 80-octane fuel with a guaranteed minimum rich mixture rating of 87-octane was made available by Shell on a nation-wide basis in 1949. It is the fuel which has engine-manufacturer approval for many models in place of 91-octane*.

Planned upgrading is also evident in the many Aeroshell Lubricants which meet the most exacting needs of modern aircraft. Such product superiority is the result of looking ahead, of anticipating needs, of continued research on a long-pull basis.

*Write for an up-to-date list of engines for which 80/87 octane fuel is approved by engine makers.

PLANNED UPGRADING is one of the three main runways of "Airport Success" which are:

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3. Shell's Planned Merchandising program.

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WHO'S WHERE

In the Front Office

Houston E. Landis, Jr., has been made vp. of Electrol, Inc. He was formerly connected with two subsidiaries of Air Reduction Sales Co.: as president of Ohio Chemical & Manufacturing Co., and vp of Acrods Corp. He also has been manager of apparatus research and asst. director of research and engineering.

Maj. Gen. Roger B. Colton has been named president of Federal Telecommunication Laboratories, Inc., succeeding **Harold H. Buttner**, who has been appointed vp and deputy technical director of International Telephone and Telegraph Corp. Gen. Colton at one time was chief of the engineering and technical service of the Signal Corps and air communications officer of the Air Technical Service Command at Wright Field. Buttner was associated with International Telephone and Telegraph since 1926.

Changes

▶ **With the Manufacturers**—Albert H. Hargreaves has joined Glenn L. Martin Co.'s public relations staff to handle community relations . . . **Stephen H. Howbert** is a new sales staff member of Beech Aircraft Corp.

Robert T. Wood has been named chief metallurgist of magnesium products for Aluminum Co. of America . . . **Charles J. Briody, Jr.**, has joined Airborne Instruments Laboratory as supervisor of technical services. **George C. Hansen**, who formerly held this position, is now working for Radio Corp. of America in the broadcast sales division.

▶ **With the Airlines**—John H. Rogers has been made cargo sales supt. of Pacific-Alaska division of Pan American World Airways. **Roger Jarman** has been made district traffic manager for PanAm in Haiti . . . **H. Victor Buetschi** has joined Swissair in a travel agency relations capacity.

Thomas J. Harris has been made American Airlines' manager of cargo sales in the eastern region . . . **L. B. Bishop** is Continental Air Lines' new manager of passenger service, replacing **Freeman Fish**, transferred to Denver as the line's district traffic and sales manager in that city.

Honors and Elections

Paul W. Litchfield, chairman of the board of Goodyear Tire and Rubber Co., has received a special award from Air Service Post 501 of the American Legion in recognition of his 40 years in aviation . . . Trans World Airline President **Ralph S. Damon** has been elected a member of the board of the Commerce and Industry Assn. of N. Y.

S. D. Daniels, secretary of the National Aircraft Standards Committee, has been awarded an honorary certificate by the American Standards Assn. for his work in developing industrial standards . . . **C. E. Mead** has been elected a vp of Lear, Inc.

INDUSTRY OBSERVER

▶ **Latest experimental version of the multi-purpose British Bristol Freighter, is being fitted with a 6-ton hopper for aerial distribution of top soil and fertilizer for reclamation purposes on heretofore inaccessible marginal land. Hopper is designed for removal from fuselage through nose doors, so the plane can be used as ordinary freighter if desired.**

▶ Fuel experts predict kerosene will power commercial turbine-powered planes rather than special high-priced fuel blends. Shell and Esso chemists say that if produced in sufficient quantity for commercial air operations kerosene will probably cost about 5 cents a gallon less than current aviation gasoline. Meanwhile aviation gasoline prices are expected to go up when kerosene comes into more general use because of storage and supply problems encountered in handling two different types of fuels.

▶ **First flight of the Piasecki XH-16 twin-engined transport helicopter is due in mid-1952. Funds to complete two of the craft are being allocated in 1951 fiscal year Air Force funds. Meanwhile component parts are already being constructed at the Piasecki Morton, Pa., plant, where the mockup of the big copter, designed for both transport and rescue, has already passed mockup board approval.**

▶ Increasing the range of many larger military aircraft by use of wing-tip tanks or underwing tanks is in the cards. Chase YC-122 assault transport is expected to increase its range to 4000 mi. with tip tanks. Douglas C-124A, Lockheed P2V Neptune are others with wing-tip versions. Presumably under-wing tank arrangement for Boeing B-50D is adaptable to B-29s and to C-97 Stratofreighters, as well.

▶ **First operations of Allison T-38 turboprop engine as powerplant for the Convair Turboliner which General Motors purchased will probably be on an experimental basis, in order to get the plane into the air as soon as possible. But Allison still plans to seek CAA certification of the engine. Schedule now calls for delivery of first T-38 to Convair at San Diego in June and second in July.**

▶ First civil transport use of the newly certificated Westinghouse J-34 jet engine is expected to be in pod auxiliary powerplants slung under the wing tips of the Boeing Stratocruiser. Pan American World Airways is reported much interested in this means for upping the performance of its Stratocruisers. Boeing engineers anticipate the extra climb performance and increased gross will pay a bonus in range, enough to fly the Atlantic both ways nonstop New York to London, regardless of winds, and increased fuel consumption.

▶ **Boeing Superfort flying boom aerial refueling tankers have been designated KB-29Ps and are in quantity production with the first 29 of the boom tankers already in service. They are designed for in-flight refueling of Boeing B-50s. It is expected that the same system will be used later in refueling the Boeing B-47 six-jet bombers.**

▶ ECA project to finance purchase of Pratt & Whitney R-4360 engines and other U.S.-Built aviation equipment for use on the big French SE 2010 Armagnac four-engine transport, resulted in disclosure that the new R-4360-C engine rated at 4000 hp. has not yet been released for export. The French wanted this engine instead of the earlier version they are getting, R-4360-B-13 rated at 3500 hp. In event the later engine is released for export soon, the French are expected to ask an additional ECA grant of $2 million to make up the difference in price, and get the newer engines. (See story on page 13.)

▶ **Aerovias Nacionales de Colombia (Avianca) is weighing the purchase of Douglas DC-6s or Lockheed Constellations. It now operates DC-4s.**

▶ Staggering cost of surface-to-air defense measures is giving defense planners pause. Recent cost study indicated that to defend one city of Washington's size against an air raid, using the Boeing GAPA rocket missile, would cost about $40 million to knock down 250 invader airplanes, or $100 million for a 1000-plane raid.

Vol. 52, No. 23

AVIATION WEEK

June 5, 1950

Convair Builds New Turboprop Transport

Production stopped on Convair-Liner; all-new plane to replace it.

By Alexander McSurely

Top management of Consolidated Vultee Aircraft Corp. huddled last week and came up with a new surprise set of signals for Convair's next play in the razzle-dazzle turbine transport game.

What the air transport industry needs is a completely new transport airframe specifically designed for turboprop engines, and Convair is the company to build it, they decided.

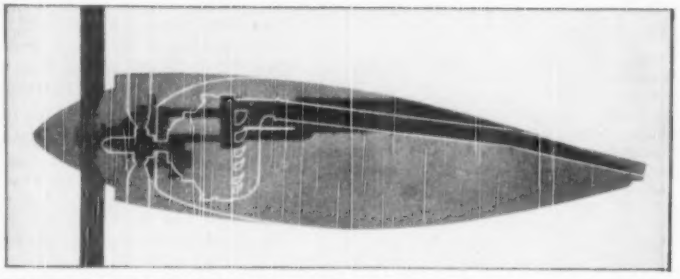
Decision as announced by LaMotte T. Cohu, Convair president, and Floyd B. Odlum, Convair board chairman, means a major policy shift. Company sales strategy, up until now, has been centered on the Convair-Liner. The salesmen were ringing doorbells in behalf of new Convair-Liners with necessary model changes to use the turboprops. Now the Convair-Liner production line is chopped off, once and for all. The salesmen are learning a new "story" for their customers, about the Convair turboprop transport, successor to the Convair-Liner.

Cohu said that the new transport was already in an advanced planning stage, "and will be designed aerodynamically and structurally with simple allowance for all anticipated increases into turboprop power."

Probably a major factor in the decision was the realization that the Convair-Liner conversion to turboprop power may not be able to utilize the full power promised from the turboprops now being developed.

▶ **Allison Turbo Boost**—AVIATION WEEK learned last week that the Allison T-38 turboprop, is expected to develop as much as 3750-equivalent shaft hp. at takeoff speed, instead of the 2750-equivalent shaft hp. at which the turbine is currently rated. Conversion from 2400 hp. Pratt & Whitney piston engines, to turboprops with only 2550-shaft hp. plus 415 lb. jet thrust, is not so critical. But boosting the power to a full third more than that supplied by the piston engines is another story.

How far the new transport plans go in swept wings, and tail surfaces, and fuselage aerodynamic cleanup is not yet clear. But the sales appeal of these "supersonic" refinements of design is an important factor for consideration along with the unquestioned improvement in aerodynamic efficiency.



POWERPLANT MATCHED: Nacelle of T-38 turboprop engine for Convair Turboliner is longer than that of Convair-Liner piston engine (white outline), but turbine unit is lighter.

▶ **Non-Interference**—The Convair president said that the new program would not interfere with interim plans to convert a Convair-Liner to Allison T-38 turboprop power for the General Motors Corp. Nor will it change plans to build turboprop modification kits to be sold to airlines now using Convair-Liners, so that they can convert these to T-38 power.

It is assumed that the converted Convair-Liners may be placarded at a never-exceed speed within the limits of the present airframe if the potential of the T-38's powercurve is realized. (Convair built 200 of the Convair-Liners, claims to have lost "nearly $50 million" in the program (AVIATION WEEK Jan. 2).

The new plane announcement obviously is a shrewd counter-move against the Martin 4-0-4 transport which will start out next spring as a piston-powered plane, but now being sold as designed for ready conversion to turboprop power.

Newspaper stories which have incorporated the Northrop Turbodyne II turboprop into the same story with the Convair announcement, left implication that that engine might be used in the new Convair transport. It is understood that the 10,000-shaft hp. Turbodyne is not being considered for the Convair project which will be basically a twin-engine Convair-Liner replacement of about equal passenger capacity. Special emphasis will be placed on very high utilization of the planes, in design features, aimed at quick loading and discharge of passengers, and ease of maintenance.

SAC Sock

Few B-36s operational, Strategic Air Command relies on wartime types.

By Ben S. Lee

SAC Headquarters, Omaha—Nearly five years after V-J Day, the backbone of the USAF long-range striking force is still the modified bomber of World War II—not the B-36. If the USAF had to go into action today with long-range bombers, they would be mostly improved B-29s and B-50s, relying on aerial refueling for extreme range missions.

Despite wide-spread publicity of the big six-engined Convair B-36 as a weapon-in-being, few of these are operational at the present time although well over 100 have been built.

Many of the B-36s already delivered have been sent back for modifications at Ft. Worth and San Diego. The B-36As are being converted into RB-36s and the B-36Bs are being converted to B-36Ds by the addition of four jet engines in pods under the wing tips. None of the jet-pod B-36s have yet been delivered.

▶ **Combat Readiness**—But on a basis of combat mission, right now, here is how the big Sunday Punch of the USAF

would stack up, as outlined to AVIATION WEEK by SAC spokesmen at Offut AFB, command headquarters.

Strategic Air Command plan overall calls for 19 groups of planes. Fourteen are heavy bomber groups and three are strategic reconnaissance groups.

Today SAC has three B-36 bombardment groups, none of which is completely equipped, and a fourth group is due for conversion. The other 11 groups are divided between 3 B-50 and 8 B-29 groups. To bring up the long-range capabilities of these 11 groups to range comparable with the B-36, mid-air refueling is planned. So the group strength of these units is being augmented by KB-29 aerial tankers.

▶**Jet Conversion**—All three reconnaissance bomber wings are flying World War II B-29s. The 5th RB wing (Fairfield-Suisun AFB, Calif.) and the 28th RB wing (Rapid City, S. D.) are scheduled for conversion to RB-36s while the 91st RB wing (Barksdale, La.) will get RB-50s as replacements for its B-29s within the next 18 months. One squadron of the 91st wing, however, is undergoing jet bomber transitional training at Langley AFB, Va., with North American B-45C bombers. When training ends it returns to Barksdale to use as interim equipment North American RB-45C reconnaissance bombers.

Still later the 91st wing is expected to become an all-jet reconnaissance wing, as the B-50s and the RB-45s are retired by Boeing RB-47s, when the six-jet bombers are ready for delivery.

▶**A Year for Strength**—Neither of the RB-36 groups will build to group strength with the big replacement bombers for at least a year. However, the replacements are expected to start coming in about Aug. 1 of this year. And each of the wings has received one or two of the earlier model B-36s, used for training. Later they will be returned to Ft. Worth for conversion.

Two of SAC's B-29 bomber groups are later scheduled for replacement by B-47 groups as soon as production of the jet bombers permits. Eventually the bomber strength of SAC will include four B-36 groups, two B-47 groups, 3 B-50 groups and five B-29 groups.

SAC plans call for reconnaissance and bomber type aircraft in each group on a 1-6 ratio. For reconnaissance bombers of the B-36 type only, the ratio will be 1-2 with B-36s performing only bomber missions.

SAC has been forced to spread both heavy bomber and reconnaissance forces thin. Recently the 3 air forces which comprise SAC—the 15th, March AFB, Calif.; 8th, Carswell AFB, Tex.; and 2nd, Barksdale AFB, La.;—each, were given control of a strategic reconnaissance wing. Formerly, all strategic reconnaissance was charged to the 2nd Air Force.

ARMAGNAC: U.S. dollars to finance competition for U.S. builders and operators?

French Planes Completed by ECA

Transports for Air France ocean service needed P & W engines; ECA buys them and U. S. lines complain.

By Alexander McSurely

A different twist in ECA foreign aviation financing last week provided U.S. powerplants and equipment for eight French four-engine Armagnac 80-passenger transports on order by Air France.

ECA funds totaling $4.5 million will buy 54 Pratt & Whitney Wasp Major R-4360-B13 engines rated at 3500 hp. each, plus propellers, accessories, radio equipment and air conditioning for the planes.

The Armagnac is most closely comparable to the Boeing Stratocruiser among U.S. transports, but is larger and slower. First prototype Armagnac had flown 110 hr. as of last May 11. The plane is a product of Societe Nationale de Constructions Acronautiques de Sud Est, at Blagnac, France. Model designation of the Armagnac is SE 2010.

ECA indicated recently that it did

ECA Aviation Procurement

Breakdown of Economic Cooperation Administration's procurement authorizations for aircraft, engines, parts, accessories, instruments and ground handling equipment shows the following purchases since April 3, 1948 in round figures:

France	$37.2	million
Italy	4.5	million
Netherlands	29	million
Belgium	2.9	million
Greece	0.9	million
Denmark	0.8	million
Norway	0.9	million
Sweden	50	thousand
Additional, not shown in above totals	0.55	million
Total	**$76.8**	**million**

U. S. Aircraft Purchased Through ECA

Analysis of U.S. transport aircraft purchased in whole or in part with ECA funds since April 3, 1948:

- France: Six Constellations, 9 used DC-4s and 2 used Constellations.
- Italy: 3 DC-6s.
- Netherlands: 2 Constellations, 6 DC-6s, 12 Convair-Liners.
- Belgium: 6 Convair-Liners.
- Denmark: 2 DC-6s.
- Norway: 2 DC-6s.

Total aircraft purchased: 13 DC-6s, 10 Constellations, 18 Convair-Liners, 9 DC-4s.

not expect to make additional purchases of U.S. airplanes as such, for foreign countries' transport use, due to the fact that American airlines had registered complaints about the unfair competition for international air travel. Previously approximately 50 U.S. airplanes had been purchased in whole or in part by ECA funds for foreign air transport use, in many cases competitive with U.S. international airlines. (See accompanying table.)

The U.S. airline complaint, which received considerable attention from sympathetic congressmen, can be summed up like this:

"Why should ECA buy airplanes for foreign state-owned airlines to operate on international air routes in direct competition with us? Why should American taxpayers' dollars be used like this to finance foreign competition to American enterprises?"

There are major differences however between the Armagnac powerplant allocation and previous outright purchases of U.S. aircraft for foreign airlines, ECA spokesmen are quick to report.

The Sud Est (South East) plant at Blagnac, was unable to obtain suitable powerplants for its new transport in its own country so that the Armagnac airframe could not have been put in service for some time if it had to wait for French engines. This would have meant shutting down the Sud Est plant with resulting unemployment and adverse effect on the French aviation industry and its military potential production capacity.

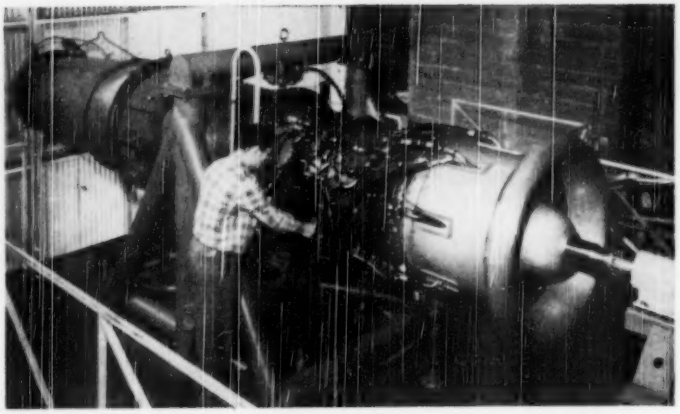
▶ **15 Planes**—It is estimated the Armagnac project will keep the Sud Est plant rolling until the spring of 1952, when the last of 15 planes are to be completed, with some 1500 employes kept at work over this period.

In addition to the $4.5 million just made available, a total of $7,396,000 has already been spent on the program, of which $1.5 million was supplied by ECA, and the remainder by the French industry. This provides for powerplants, propellers, etc., for the prototype and the first seven production planes, plus 10 spare engines.

First production SE 2010 is due for completion in July, and the seventh in Nov. 1951. Then the first airplane which will use engines under the new ECA allocation will follow on the schedule, with its completion due in Jan. 1952. Engines purchased under the new allocation, however, are needed to feed into the production line beginning in May 1951.

Analysis of the ECA Armagnac project shows $3.6 million goes for the 54 engines, with another $285,000 for powerplant accessories. Curtiss C-644 SB-306 propellers, with spare blades, will cost $220,000. The remainder of the sum is apportioned like this: For other accessories, such as fuel and water pumps, various indicators, fire extinguishing equipment, etc., $165 thousand; air conditioning, including blowers, exchangers, filters, controls, etc., $175,000 and radio equipment, such as receivers, transmitters, terminals, antennas, shielding, etc., $35,000.

While the French airplane will be probably more closely competitive with the Stratocruiser than any other, the French manufacturer came to Boeing for engineering advice on its nacelle installations. And engineering for the first nacelle installations was handled on a powerpack basis by Rohr Aircraft Corp. of Chula Vista, Calif., and Pratt



Turbodyne Completes Test Run

Northrop Aircraft's XT-37 Turbodyne is now fully qualified for preliminary flight tests, after successfully completing its 50-hr. endurance-testing program.

The Turbodyne was developed for the Air Force by a Northrop subsidiary, the Turbodyne Corp.

The engine is described as the most powerful propeller-type aircraft power plant in the world, having delivered more than 10,000 hp. in tests. During its endurance-proving program it delivered 7500 hp. continuously over "long intervals of time," Northrop says. During one phase it was operated at 8000 hp. output, simulating emergency conditions.

▶ **No Breaking In**—The full 50-hr. endurance program was conducted on a standard engine directly after it was assembled. Within 30 min. of its installation on the two-story test stand, the XT-37 was delivering 7500 hp. without any "running in," according to a company spokesman.

He said he thought he could repeat the endurance runs without opening the engine for inspection.

Complete power unit tested consisted of engine, reduction gears, propeller and single-lever automatic electronic control system.

▶ **Components**—Components were developed under a coordinated program with accessories manufacturers. Reduction gear, developed by Western Gear Works of Los Angeles, provides 8.25 to 1 reduction and delivers dual rotation to concentric shafts.

Six-bladed, constant-speed, dual-rotation propellers were developed by Aeroproducts division of General Motors. Single-lever automatic electronic control system, developed by Eclipse Pioneer division of Bendix Aviation Corp., combines normal throttle and propeller controls, automatically matching engine throttle and power to propeller load condition.

▶ **Development**—Present Turbodyne is a product of nearly 10 years research by the Turbodyne Corp., America's oldest gas turbine research organization. Northrop was first awarded a Navy contract to develop a geared gas turbine in 1941. First successful turboprop engine was built under a joint Navy-Air Force contract and designated the Alpha 1500 or Turbodyne I. Navy backed out in June, 1945 when the Turbodyne was wrecked in a test run.

Northrop continued with its research under an Air Force project, but dropped the pusher Turbodyne XT-37 when that service decided not to install turboprops in the Flying Wing. Subsequent development work led to the new XT-37, designed for both pusher and tractor installation.

The Turbodyne is ready for mounting in an airframe, but the Air Force has not yet said whether it will contract for that test.

April Contracts Top $16 Million

Air Force this week listed contracts in excess of $100,000 awarded during the month of April. Top award among a total of $16,648,143 in contracts was for $2,600,000 to Curtiss Wright Corporation, Propeller div., for: propellers, spinners and controls for B-50 and B-29 aircraft.

Other April contracts follow, with value and date of contract given (dates prior to April indicate original letter of intent):

Aeroproducts div., General Motors Corp., Dayton, A-422-E1 propeller blades, tools, spare parts, etc., for T-28 aircraft, Dec. 1, $544,913.

American Coleman Co., Omaha, F-5 towing tractor, spare parts, data, Apr. 14, $1,296,122.

Bendix Radio div., Bendix Aviation Corp., Baltimore, major components for radio compass AN/ARN-6, Feb. 16, $966,180.

Connecticut Telephone & Electric Corp., Meriden, telephone central group GTA-4, Apr. 26, $1,104,841.

Cornell Aeronautical Laboratory, Buffalo, flutter models, Apr. 11, $156,-410.

Eclipse Pioneer div., Bendix Aviation Corp., Teterboro, boost controls and spare parts hereof, Apr. 11, $191,015.

Eisner, Sigmund Co., Red Bank, N. J., flying clothing, Apr. 21, $250,-820; caps, type O-1, shirts, type A-1, trousers, type E-1, Apr. 21, $177,964.

Fairchild Camera & Instrument Corp., Jamaica, N. Y., major components for radio compass AN/ARN-6, Feb. 15, $1,115,139.

Gardner Corp., New York, jackets--flying intermediate type B-15B, Apr. 26, $591,139.

General Precision Laboratory Inc., Pleasantville, N. Y., miscellaneous photo equipment, Apr. 12, $419,074.

Goodrich, B. F., Co., Akron, 56 x 16 wheels and brakes, Jan. 24, $1,-330,858.

Goodyear Tire & Rubber Co., Akron, main wheels and brakes, Apr. 6, $102,680.

Hamilton Standard Propeller div., United Aircraft Corp., East Hartford, Conn., redesign of control assembly blueprints and engineering reports, Mar. 16, $199,851.

Irving Air Chute Co., Buffalo, canopy assembly, Apr. 26, $107,307.

Jack & Heintz Precision Industries, Cleveland, generators, Apr. 13, $523,-554.

Jumbo Steel Products Co., Azusa, Calif., portable engine hoist type A-7A, Apr. 28, $159,936.

Kidde, Walter & Co., Belleville, N. J., fire extinguishers, Mar. 15, $126,-456.

Lapointe Machine Tool Co., Hudson, Mass., new type broaching machine, Apr. 11, $106,797.

Link Aviation, Inc., Binghamton, N. Y., trainer, flight instrument type C-11A, Apr. 7, $1,520,000.

Mead Aviation Equipment Co., Trenton, N. J., back type cushion, Apr. 18, $143,520.

Mine Safety Appliance Co., Pittsburgh, oxygen masks type A-13A, Apr. 18, $101,000.

Reed Products, Inc., Milwaukee, jackets type N-3-N-2, trousers type F-1 and D-1, Apr. 21, $355,464.

Seaboard Electric Co., New York, servo control, spare parts & data, Mar. 23, $124,080.

Shaw & Estes, Dallas, spin pit, engineering and maintenance data (for propeller testing), Apr. 6, $338,030.

Switlik Parachute Co., Trenton, N. J., pack assemblies--back style, Apr. 6, $470,000; parachute--personnel back type 28' canopy, Apr. 18, $912,800.

Transducer Corp., Boston, maintenance parts for trainer AN/APQ-13 T1A, Mar. 31, $145,673.

U. S. Rubber Co., New York, aircraft hose, Apr. 26, $109,077.

Vanant Products, Inc., Tomah, Wis., engine cuvelopes, Apr. 18, $133,463.

Western Electric Co., New York, computers, test sets, control units mounting and data, Mar. 20, $313,950.

& Whitney. The Rohr company makes powerpack nacelles for Boeing B-50 bombers.

► **Specifications**--Comparison of specifications between the two planes shows greater utilization of space, and load carrying through more efficient design of the interior in the Boeing plane which carries approximately the same payload with full gas, and the same maximum number of passengers, although the Armagnac fuselage is 20 ft. longer.

Comparison shows:

	Armagnac	Stratocruiser
Length ft.	130	110
Span ft.	160	141
Gross wt. lbs.	170,000	142,500
Payload with full gas lbs.	33,000	30,000
Cruising speed (mph.)		
Passengers	80	80

(Note Armagnac cruising speed shown is at 25,000 ft., while Stratocruiser cruising speed is at 15,000 ft.)

Other Armagnac data reported includes: Cylindrical, pressurized fuselage with cantilever midwing; four integral fuel tanks in each half wing; hot air de-icing; special flaps; dual wheel tricycle gear hydraulically retractable; powerplants interchangeable and replaceable in less than an hour; four-blade propellers of 15 ft. 2 in. diameter, with reversible pitch for braking, and electric de-icing; engine cowls designed in two pieces, hinged at rear for full access opening; CO_2 fire extinguisher.

Air France expects to use all 15 of the big airplanes eventually for passenger transportation on North and South Atlantic routes and on other intercontinental routes between France and its colonies.

NEW PERCIVAL BASIC TRAINER

First photo of Percival Aircraft's new P.56 side-by-side basic trainer for the Royal Air Force shows landing gear with fairings yet unfitted. The P.56 is powered by a 420-hp. Armstrong Siddeley Cheetah 17 engine. It is fitted with complete radio and night flying equipment. Construction was kept as simple as possible so plane could be serviced by semi-skilled maintenance personnel without the necessity for special tools or ground handling equipment. Short takeoff and landing runs and high rate of climb are called for in the specification. Handley Page has similar plane, H.P.R.2. It uses same power plant.

Liaison Entries

Piper PA-19, Cessna Model 305 are leading contract contenders.

Final decision in the 500-plane Army liaison contract was being weighed last week, following completion of Air Force evaluation flight tests on four competing planes at Ft. Bragg, N. C.

Unofficial sources indicated that Cessna's all-metal Model 305 and Piper's PA-19 are battling it out for first place. The Cessna, due to its more powerful engine, apparently holds the edge as far as performance is concerned.

But on a basis of comparative engine prices alone, it is assumed the Piper entry price would be the lower, and that this factor might be a strong influence in the decision if the performance differential were relatively slight.

Of 14 manufacturers originally indicating interest in the USAF's invitation to bid, only five presented prototypes, and one of those was damaged in preliminary flight tests (Fletcher). The five competitors were Cessna, Piper, the Taylorcraft 18, Luscombe T-8F-L and the Fletcher FL-23.

Requirements established by the Army call for a plane which can:

- **Carry a crew of two.**
- **Cruise at 78-knot** speed at not more than 75 percent power.
- **Climb at a minimum** rate of 800 ft./min. for first minute.
- **Fly slowly** with no loss of altitude with a full gross load and full control at not more than 43 knots.
- **Have a service ceiling** of not less than 17,000 ft.

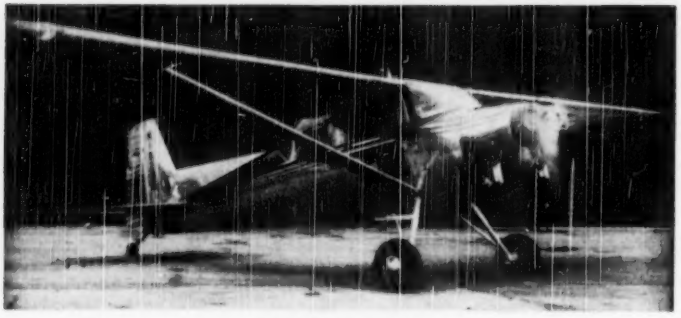
▶ **Fletcher FL-23**—The Fletcher all-metal FL-23 arrived at Wright Field for preliminary test several days after the other entries. It was descending from an altitude climb test when control surfaces were overloaded and damaged. The Air Force test pilot and observer bailed out. The Fletcher plane leveled out upside down, and landed in that position, with considerable damage. Plane was taken back to the Fletcher plant at Pasadena, Calif., for repairs, but these were not completed in time for it to make the flight-test deadline at Ft. Bragg.

Pentagon sources told AVIATION WEEK that the plane had not been finally disqualified from the competition. Indications were that the FL-23 may be permitted to take a special "make-up" evaluation test, with results to be considered along with performance of the other four planes.

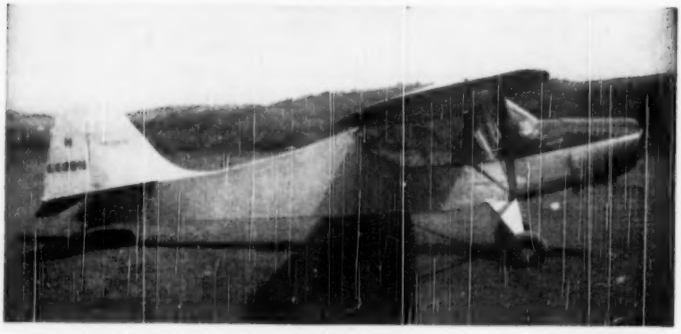
Performance figures and specifications quoted by the manufacturers for the entries:

- **Cessna Model 305**—Cruising speed at 5000 ft. at 79 percent power, 90 knots;

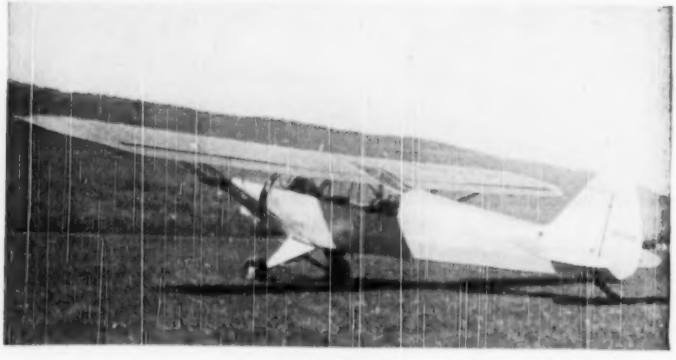
CESSNA 305



LUSCOMBE T-8F-L



TAYLORCRAFT 18



PIPER PA-19

observation speed at constant altitude with full control, 40 knots; endurance at cruising speed, with 20 gal. fuel, 3.1 hr.; rate of climb, 1290 ft./min.; ceiling, 22,900 ft.; takeoff over 50 ft. obstacle, 560 ft. (sod field); landing run over 50 ft. obstacle (sod field), 600 ft.

Range at cruising speed with 20 gal. is 306 miles; stall speed without flaps, 48 knots; stall with flaps, 42 knots; takeoff ground run at 2100-lb. gross, 306 ft.; landing ground run same condition, 300 ft.; maximum fuel capacity, 42 gal.; gross weight (under CAR part 3 utility category) 2100 lb.; alternate gross weight (under CAR part 3 normal category) 2430 lb.; weight empty, 1448 lb.; wing loading, 12.1 lb./sq. ft.; power loading, 11.05 lb./hp.; powerplant, Continental E-190, six cylinders, rated at 213 hp. at 2600 rpm. for takeoff, and 190 hp. at 2300 rpm. normal rating.

Plane is all-metal high-wing design, using some parts of the commercial Cessna Model 170 four-placer. The Model 170 parts used include standard wing, with special new high lift flap; aft portion of fuselage, and tail surfaces; and vanadium spring steel landing gear. New features include folding rear seat rudder pedals which fold out of observer's way when not in use, and new design control lock. Performance figures quoted are at sea-level, standard temperature, 2100 lb. gross weight, sod field, unless otherwise noted. Wing span is 36 ft.; height, 7 ft. 6 in.; length, 25 ft.

• **Piper Model PA-19**—Plane is a military version of the new commercial Super Cub PA-18. Powerplant is a 125 hp. Lycoming engine. Takeoff over a 50 ft. barrier reported as less than 600 ft. at 1750 lb. gross weight. Empty weight is 1070 lb. Plane will carry enough fuel (37 gal.) for six hr. cruising with 200-lb. crew members with parachutes, 40 lb. of radio and 60 lb. miscellaneous equipment.

Piper engineers state the plane will meet or exceed the Army requirements for the competition, previously stated. Obvious differences between the PA-19 and the civilian PA-18 Super Cub, are in the more powerful engine, modified cockpit with greater Plexiglas area in top and rear windows, and a large shelf aft of rear seat for radio, tactical and navigational equipment. Construction is steel tubing fuselage and metal structure wing, fabric covered.

• **Luscombe T-8F-L**—A military version of the all-metal Silvaire. Plane carries a crew of two, 40-lb. radio, and 60 lb. miscellaneous equipment. Powered by a Continental 90-12F developing 90 hp. Gross weight is 1550 lb., empty weight is 950 lb. Takeoff with full load over a 50-ft. obstacle in 495 ft. and landing run over a 50 ft. obstacle in 375 ft. is reported. Top speed is 115 mph.

The T-8F-L can be flown under 40 mph. It will stall with power on and flaps at 35 mph. Plane features a swing engine mount and instrument panel mounted with Dzus fasteners. 75 percent of parts are interchangeable with Silvaire. All-metal construction.

• **Taylorcraft Model 18**—Is powered by Lycoming 290D engine developing 125 hp. Gross weight is 1700 lb., empty weight 1050 lb. Payload is 620 lb. including 40-lb. radio and 60 lb. miscellaneous equipment. Takeoff over a 50-ft. obstacle is 209 ft. It can land in 500 ft. after clearing a 50-ft. obstacle. The plane carries fuel for 6-hr. range at a cruising speed of 110 mph. Top speed is 125 mph. Rate of climb first minute is 960 ft. Hovering speed is approximately 40 mph.

Measure Would Streamline Research

Legislation streamlining military research and development laws has been introduced by Chairman Millard Tydings one of the members of Senate Armed Services Committee and Chairman Carl Vinson of the House Armed Services Committee.

The measures would:

• **Give the three military** secretaries a free hand to establish advisory committees for research and development activities.

• **Remove legal prohibitions** to the employment of scientific personnel who are foreign nationals by the military departments.

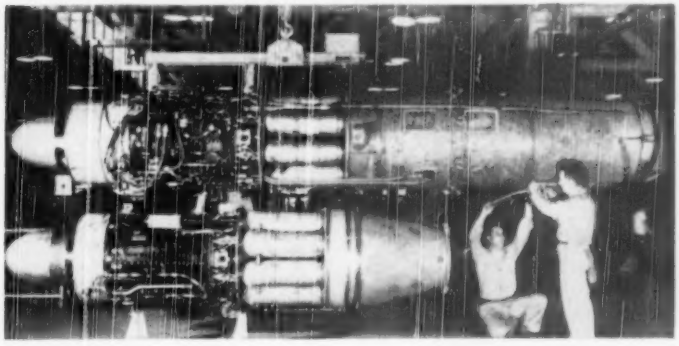
• Permit cost-type contracts, up to a five-year period, for research and development projects. The term of the contracts could be extended if appropriations were made.

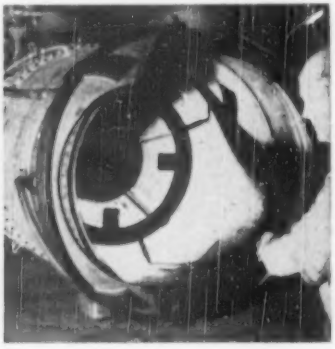
• **Authorize the departments** to provide for test facilities and equipment in research and development contracts.

• **Authorize the three secretaries** to provide that the government will indemnify contractors against liability for death, injury, or property damage to employes, "arising as a result of risk defined in the contract to be unusually hazardous."

Urge An Appraisal

Air Reserve Assn., with membership of 25,000 former Air Force officers, is urging that President Truman appoint a new commission similar to the Finletter Commission to make a reappraisal of American air power in light of present world situation.





J-47 REHEAT UNIT

General Electric has developed this afterburner unit for its 5200-lb.-thrust (dry) axial-flow turbojet, believed to boost thrust to approximately 7500 lb. The photos show engine's increased length over the standard model beneath it. Closeup of afterburner's exhaust shows the clamshell-type movable lips, automatically controllable for varying exit area to obtain optimum engine performance under various flight and power conditions. This model J-47 is fitted to the new Republic XF-91 and North American F-95A interceptors. There are three J-47 engines currently in production: J-47-GE-11, J-47-GE-13 and J-47-GE-15.

PRODUCTION

West Coast Fights for Its Share

California groups charge aircraft business is being channeled to inland areas. But Air Force says no.

California's congressional delegation, backed by labor, has opened a new offensive to curb "the clearly apparent trend to channel business away from Pacific coast aircraft plants" (AVIATION WEEK May 22).

Despite repeated Air Force assurances that no dispersal of plane construction to the strategically less-vulnerable "dust bowl" area is contemplated, the Californians and the International Association of Machinists point with concern at the concentration of USAF business at the government-owned Wichita plant operated by Boeing Airplane Co. and the government-owned Fort Worth plant operated by Consolidated Vultee Aircraft Corp.

It is charged that aside from a small repair job awarded the San Diego plant of Consolidated, no new aircraft business has been given coast companies for over six months. Heavy unemployment among coastal aircraft workers is cited. There are reports that the standby Tulsa plant, operated during World War II by Douglas Aircraft Co., will be reopened by some other manufacturer drawing additional work from the coast.

Announcement by the Army Corps of Engineers that it is moving its headquarters out of the Tulsa plant has touched off a new wave of speculation on reopening of the factory for aircraft production. This speculation is being vigorously promoted by the Oklahoma congressional delegation and chambers of commerce.

At a meeting last week the California delegation decided to press for these two objectives:

• **Allocation of more USAF** overhaul business to private concerns. In a speech on the House floor, Rep. Carl Hinshaw of Calif. reported that the 1951 fiscal year budget earmarks $144,971,000 for overhaul work at USAF depots, and only $18,563,000 for work by USAF contractors.

He said that 2342 planes will be overhauled at depots, involving the employment of 30,012, and only 293 at private plants, involving the employment of 2500. He objected that, not only will depots be allocated eight times as much work, but will require 12 times as much money for the work as private contractors.

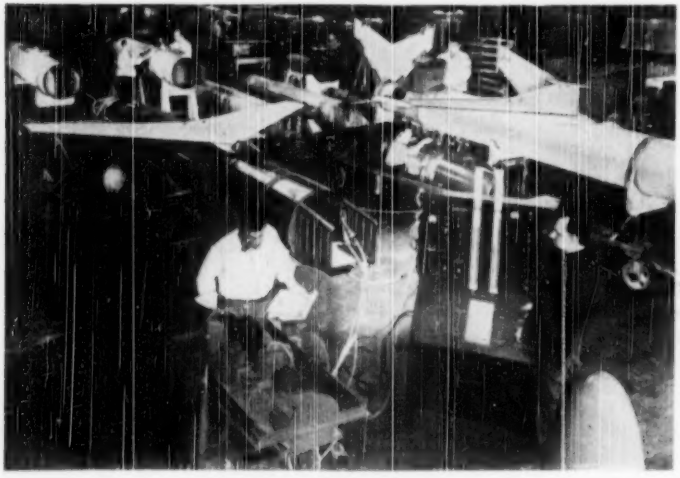
Pointing to testimony by Lt. Gen. K. B. Wolfe, Deputy Chief of Staff, that contractual arrangements for modernization "are limited to those cases where the facilities to perform the required services are not available in our depots," Hinshaw declared that "this policy is a far cry from the recommendations" of the President's Air Policy Commission, headed by Thomas Finletter, now Secretary for Air. The Finletter Commission's report said: "Testimony . . . has indicated the economy and other advantages of having modifications and overhaul of military aircraft done by . . . civilian organizations under contract. . . . We . . . recommend that the services weigh carefully the savings possible through contract overhaul, and the possible long-term advantages of building up civilian staffs trained in such work for use in an emergency."

• **Full rental** for government-owned facilities. Only a nominal fee is now paid for the Boeing Wichita plant and the Fort Worth Consolidated plant. Californians object that this gives operators of the two installations, free of the overhead burden of plant cost and taxes, an advantage in contracting for procurement business.

Hinshaw and Rep. Chet Holifield are both planning to introduce legislation requiring operators of government-owned plants to pay local taxes as well as "full rental" to the federal government.

"More and more procurement of the armed services is going into government-owned plants all over the country," Hinshaw declared. Holifield said that "this is a direct blow at private industry, because it subsidizes one type of private industry against another type by furnishing them jigs, dies, tools, and plant facilities at a dollar-a-year cost, and puts them in competition with private industries who have their whole capital investment to charge off when making bids on government contracts."

IAM will push the proposition, claiming that virtually free rental of government plants is a step toward nationalization which will likely lead to bringing plant employes under civil service.



MARTIN DRONE LINE

First production line view of Martin KDM-1 target drones now being delivered to the Navy for testing ship fire control systems. In the foreground, the completed controls system for one of the tiny craft is being tested on a Scorsby tilt-top table, with results being recorded at right. The KDM-1 has a 10-foot wing span and is powered by a Marquardt ramjet. Launching is from a mother plane.

B-36 Service Docks

USAF Air Materiel Command has awarded Texas Engineering Manufacturing Company, $500,000 contract for manufacture of 16 ship sets of all-weather mobile B-36 servicing docks.

Docks are constructed of structural steel, plywood floors and corrugated aluminum roofing. 112,500 sq. ft. of space at North American's old plant "A" has been leased for dock fabrication work.

Maintenance Company Enlarges Facilities

Grand Central Airport Co., Glendale, Calif., has announced major expansion moves and has changed its name to Grand Central Aircraft Co. to clarify its new position in the industry.

The Glendale firm has purchased all physical assets of Aviation Maintenance Corp. at the Van Nuys, Calif., Airport. Grand Central will ship the majority of these assets to its newly leased plant at Tucson, Ariz. Balance of the equipment obtained from AMC will be sold.

►**Tucson Plant**—Grand Central's new facilities at Tucson Municipal Airport have about 420,000 sq. ft. under cover. The $6-million plant, formerly occupied by Consolidated Vultee Aircraft Corp. as a wartime modification center for B-24s and B-29s, was acquired by Grand Central under a 20-year lease.

Facilities at Tucson will enable Grand Central to bid on maintenance and overhaul of larger planes than the Glendale hangars or runways can accommodate. Operations will continue at Glendale, and headquarters will remain there.

Because of the seasonal nature of the business, operating personnel at the Tucson plant may vary between 300 and 2000 employes. This is about the same number employed at the Glendale plant.

Douglas Expands Its Static Test Building

Douglas Aircraft Co. has started construction at its El Segundo plant of a 100 × 120-ft. addition to its static test building, to accommodate larger aircraft. The new building will have the latest types of hydraulic tension and compression cylinders. Airplanes or tests units will be raised, dropped, twisted or tortured by a flick of the operator's wrist.

Height clearance of 40 ft. will permit full-scale testing of all types of carrier aircraft. Hoists will be rated at 100,000 lb. A network of hold-down beams in the floor will resist 30-million-in.-lb. loads. Overhead cranes will cover the entire usable area.

Douglas was forced to start the building sooner than originally planned when it ran out of ceiling on a recent drop test of an AD-3. Engineers had dropped the plane from 101 in. at a terminal velocity of 23½ fps.—almost double the required 13 fps.—without damage. That put them against the roof, so craft couldn't be dropped until failure.

H. A. Campbell, in charge of static testing, and C. H. Stevenson, chief of the strength section, predicted that on the basis of the tests, an AD-3 can land on a carrier under conditions three times more severe than its predecessor, the AD-1.

Skyline Corp. Formed

The assets of Davis Manufacturing, Inc., Wichita, Kans., wartime aircraft subcontracting concern, have been taken over by the Skyline Corp., with Harry T. Rowland, former vice-president and general manager with Glenn L. Martin Co., named as president.

The new concern plans to specialize in farm machinery, but also has opened a division in Dayton, Ohio, to specialize in aircraft armament and associated equipment. Rowland worked on Martin's power turret program. He believes the airframe field is "overcrowded and too tough" at present.

Other officers of the new company include: William G. Rabe, chairman of the board and treasurer; Edward Y. Baugeard, secretary; and directors Nelson S. Talbott, Joseph P. Routh, and Samuel K. Mitchell.

AF Bid Information

Bids openings are 20-30 days after approximate issue dates shown in the following bid proposals. Bid sets containing specifications for items to be procured will be sent to qualified applicants who state bid invitation number.

One bid set will be available for examination without obligation by prospective bidders, after bid publication date, at each of the seven AMC procurement field offices. This will enable firms to see specifications before writing or telegraphing for their own bid sets.

Procurement field office locations: Boston Army Base, Boston 10, Mass.; Government Aircraft Plant No. 4, Ft. Worth 1, Tex.; 39 S. LaSalle St., Chicago 3; Wright-Patterson AFB, Dayton, Ohio; West Warren and Longo Aves., Detroit 32; 155 W. Washington Blvd., Los Angeles; 67 Broad St., N. Y. 4.

Heater-induction, 3 ea. bid invitation No. 50-1803, opening date 5 June, delivery within 60 days.

Voltage regulators, 644 ea., bid invitation No. 50-1872, opening date 5 June, delivery 200 per month starting Mar. 1951.

Cord assembly, 9000 ea., bid invitation No. 50-1925, opening date 6 June, delivery within 30 days.

Tube assembly, 756 ea., bid invitation No. 50-1926, opening date 6 June, delivery 378 ea. July 1950, 378 ea. Aug. 1950.

Filler oxygen valves, 1,969 ea., bid invitation No. 50-1790, opening date 5 June, delivery complete by Sept. 1950.

Camera covers, 940 ea., bid invitation No. 50-1933, opening date 6 June, delivery within 120 days.

Aircraft generators, 186 ea. bid invitation No. 50-1922, opening date 7 June, delivery 20 per month starting in Nov. 1950.

Regulators, 186 ea., bid invitation No. 50-1924, opening date 6 June, delivery 20 per month starting Nov. 1950.

Rack assembly, 1050 ea., bid invitation No. 50-1909, opening date 6 June, delivery 150 ea., starting Sept. 1950, and 50 per month until complete.

Air compressors, 1-13 items, bid invitation No. 50-1900, issue date 18 May, delivery start within 60 days and complete within 120 days.

Cradle assembly; hoist installation, 1-2 items, bid invitation No. 50-1882, issue date 15 May, delivery within 60 days, complete within 90 days after receipt of notice of award or contract.

Photographic equipment, 1-2 items, bid invitation No. 50-1855, issue date 15 May, delivery within 60 days.

Emergency sustenance kits, 5000 each, bid invitation No. 50-1874, issue date 15 May, delivery starting within 60 days and continue at a minimum of 20% each 30 days thereafter until complete.

Office equipment, 1-5 items, bid invitation No. 50-185, issue date 15 May, delivery complete within 60 days.

Photographic equipment, 1-9 items, bid invitation No. 50-1899, issue date 15 May, delivery complete within 60 days.

Computer assemblies, 1-6 items, bid invitation No. 50-1892, issue date 15 May, delivery begin Aug. 1950, complete Oct. 1950.

Flying gloves, 7090 pairs, bid invitation No. 50-1890, issue date 15 May, delivery complete within 120 days.

Dummy loads, 1-2 items, bid invitation No. 50-1863, issue date 15 May, delivery 1st articles within 90 days, balance within 90 days.

PRODUCTION BRIEFING

►**Cessna Aircraft Corp.** has received a new order for its furniture division at Hutchinson, Kans. The Army Quartermaster Corps has contracted for about $500,000 more composite wood and metal furniture of the type Cessna has been manufacturing for the force. New contract will run through October.

►**Goodyear Aircraft Corp.** is modifying a Navy ZPK airship to ZP2K configuration, which incorporates the latest electronic equipment for hunter-killer submarine use. The nonrigid airship will be turned over to Naval Reservists at Akron, Ohio, after modification.

►**Boeing Airplane Co.,** Wichita, was shooting for the 10,000 employment mark in mid-May.

►**Rohr Aircraft Corp.** has received $3,900,000 in new orders from Boeing for power plant assemblies for B-50 bombers and C-97 Stratofreighters.

►**Weber Aircraft division** of Weber Showcase & Fixture Co. has new contracts in its growing aircraft seat business: 138 crew seats for Douglas C-124s; 30 flight engineer's seats for USAF; 100 navigator's stools for Navy R5Ds.

►**Glenn L. Martin Co.** has contracted with the industrial design firm of Butler-Zimmerman, Inc., New York, to design the cabin interiors of the Model 4-O-4 being built for Eastern Air Lines and TWA.

►**Aluminum Co. of America** has increased the price of 99 percent aluminum pig and ingot by one-half cent per pound. New pig price is 16½ cents per pound; ingot price in 30-lb. size now is 17½ cents per pound.

FINANCIAL

Domestic Airlines Continue Gains

Most carriers show a substantial improvement over their first-quarter earning records of last year.

The domestic airlines continue their consistent improvement in earnings accompanied by bolstering of their credit. This is demonstrated by the results of the first quarter of this year, and by the preliminary indications of April and May traffic.

But selectivity in earnings is more pronounced than ever before. In fact, the combined results of the 16 domestic airlines, if taken as a group, would show an estimated net loss of around $6 million for first-quarter 1950 as against an adjusted $5 million loss for the same 1949 period. Northwest Airlines, with a net loss of $3,612,000, contributed more than one-half of the industry's current net deficit and distorts the group's record of solid accomplishment.

► **Better Than Usual**—Excluding the contrary experience of Northwest, the industry's first quarter—traditionally the worst for most carriers—shows substantial gains over corresponding periods of prior years. Previous first quarter records for the 16 domestic airlines:

- 1948—A deficit of more than $13.8 million.
- 1947—A deficit of more than $18.7 million.

It must be recognized that these staggering losses were subsequently modified somewhat by retroactive mail awards. Nevertheless, even after such adjustment, it is probable that the 1950 showing remains the best in the last four years.

The 1947 and 1948 first quarters reflected a series of bad crashes, equipment groundings and inclement weather conditions. The fact that substantial recoveries were achieved during the 1949 first quarter, with even further gains recorded for the like period in 1950, is tangible evidence of the improvement in the safety and dependability of air transportation.

A significant measure of the current gains in earning power is available through an examination of the results of the "Big Four"—accounting for between 75 to 80 percent of the domestic traffic. These carriers—American, Eastern, United and TWA—showed a consolidated net loss of about $5.3 million for the 1949 first quarter. The same group reported a net loss of less than $3.7 million this year. This improvement would have been greater if not for the 11-day strike on American during March.

Increased efficiency and improved cost control are in evidence for most carriers. This is highlighted by United's quarterly report, the only detailed account which has been issued among the Big Four.

During the first three months of 1950, United's operating revenues were up 4 percent while operating expenses increased only 2 percent. United's operating cost per ton-mile was decreased 3 percent from 1949's first quarter. It dropped from 61.7¢ to 60.0¢. Although traffic increased, United reduced its personnel at the end of the first quarter by 620, to 9477.

► **Let the Credit Go**—United's recent action, canceling a standby credit agreement previously in effect, shows the strengthening of airline credit. Last September, when the company ordered five new DC-6s, it arranged a $3.5 million standby credit with 35 banks in case it were needed to pay for these new aircraft. Deliveries of the five planes will be completed shortly. Payments will be made from the company's current finances without recourse to any new borrowing.

With additional aircraft on order and scheduled for delivery early next year, United's action demonstrates confidence in its ability to finance all outstanding capital requirements as well as to maintain a heavy debt-retirement schedule.

► **Parcel Post Push**—The effect of air parcel post gains is apparent in the 7.3 percent increase in mail ton-miles during first-quarter 1950. Mail revenues, however, increased but 2 percent, reflecting the sliding scale of mail rates in effect for the Big Four.

As with most carriers, current results have a very tentative characteristic in view of pending mail rate proceedings. For United and others in the Big Four, temporary rates are in effect currently and apply also to periods back to early 1948. Until permanent mail rates are established by the Civil Aeronautics Board, all current results are subject to qualification.

TWA shows a consolidated net loss of $1,844,049 for first-quarter 1950, as compared with a net loss of $3,013,020 for the same period in 1949. No indication is provided as to how this loss in both years was divided by the domestic and international divisions.

Further, TWA is subject to important mail rate proceedings on both its international and domestic services, and the published summarized quarterly report gives no indication as to how these mail compensation questions are handled.

Nevertheless, the TWA performance is noteworthy: while total revenues for the current first quarter are down slightly, the company's net loss was cut by more than one-third. A proper comparison with last year's results will be afforded only when the company's reports are filed with the CAB.

It appears that both American and United have reduced their first quarter losses by applying tax credits which will be offset by the subsequent profitable periods of this year. This practice tends to smooth out sharp fluctuations in earnings and gives a more accurate picture of results.

► **North-South Profits**—Unlike the transcontinental carriers, such north-south lines as Eastern, National, and to a lesser degree, Delta, experience their most profitable season during the first quarter. Comparative first-quarter results for these carriers may be summarized as follows:

	Net Profits	
	1950	1949
Eastern	$1,569,999	$1,298,065
National ...	1,043,313	717,929
Delta	272,644	238,479

The operations of Eastern and National reflect tangible results and are not due to any flukes. They are therefore encouraging indications of the industry trend for this year.

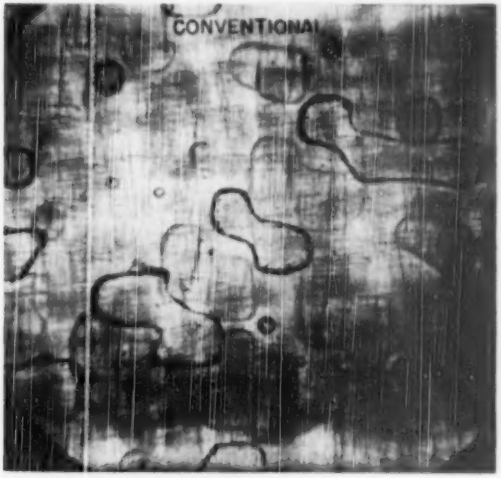
► **Capital Gains**—Capital continues its outstanding record of low-cost operations and improved performance over corresponding periods of a year ago. The company showed an operating loss of only $128,032 for the first quarter of 1950, against the loss of $353,480 in the 1949 period.

It is also significant that Capital, admittedly a carrier with a subsidized mail rate, has continued to lessen its dependency upon mail compensation. For example, during the 1949 first quarter, almost 28 percent of its total revenues came from mail payments. For 1950, this ratio was down to about 24.5 percent.

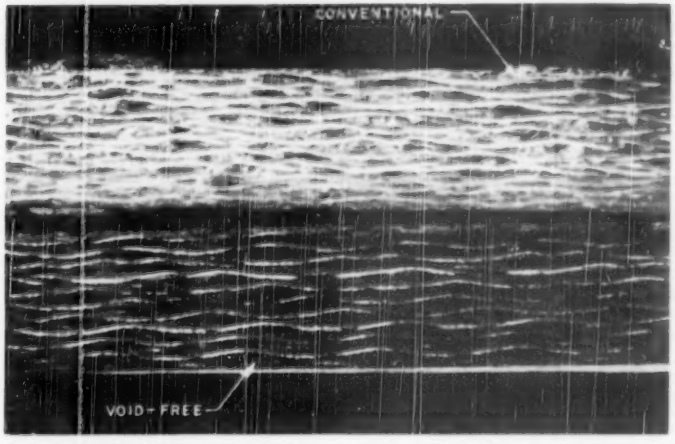
The results achieved by the domestic carriers thus far in 1950 are encouraging portents of continuing gains this year.

It must be recognized, however, that for the major profitable airlines, the full federal income tax will be in effect and may prove a restraining factor in the year's final accounting of net earnings.

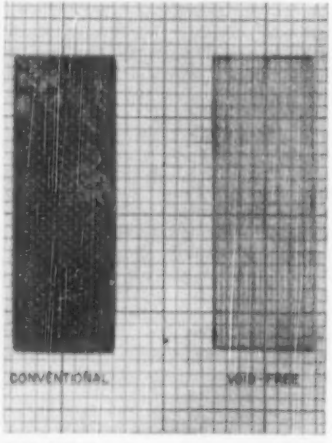
—Selig Altschul



A 25X MICROPHOTOGRAPH demonstrates fabric voids in conventional laminates. Void-free material shows only a few thread voids.



CROSS-SECTIONAL comparison of conventional and void-free laminated material showing the larger type of voids, which appear to concentrate in the center of the material.



POROSITY and transparency comparison of void-free and conventional laminates.

Bubble-Free Laminates Stand Up Better

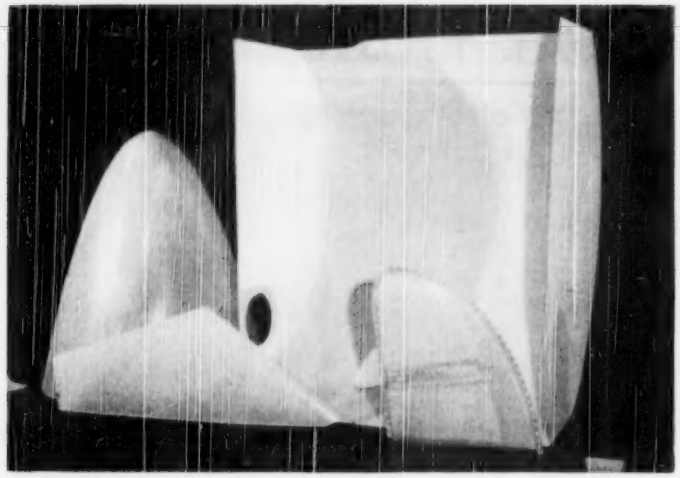
Goodyear finds strength and resistance to rain are greatly increased by making laminates void-free.

Rain and radomes have never gotten along well together–but some new developments arising from a program sponsored by Air Materiel Command and carried out by the Goodyear Aircraft Corp. promise to reconcile the two.

The familiar radome–and many another non-structural part–when made from fabric-laminated plastic material, is susceptible to the eroding bombardment of raindrops. This results in rapid deterioration of the material with loss of strength immediately following.

Goodyear found that by developing a void-free Neoprene-coated laminate, the rain erosion problem was substantially licked, and at the same time, improvement of the physical properties of the material was obtained. These findings have been summarized in a report, "Void-Free Laminates," by B. D. Raffel and E. Duplaga.

▶ **Background**–The development of liquid polyester laminating resin binders some years back led to their extensive use in low-pressure and no-pressure molding of fabric-laminated



TYPICAL CLOTH and plastic laminated parts for the Grumman F9F-2 Panther include fuselage nose, rudder cap, a tank liner and a fin section.

aircraft parts. The smooth surface of these cloth and plastic pieces fits them ideally for application on high speed aircraft in non-primary structures.

As a result, the laminated products bandwagon soon became crowded with enthusiastic users, who were impressed with the ease of processing and the minor tooling involved. There was, of course, more to the matter than met the eye.

For example, little attention was paid to the presence of voids within the laminates, although it had been shown that such voids contributed materially to strength defects in the material. In the case of phenolic-resin cotton-fabric laminates, physical properties varied almost in direct proportion to the absence of voids.

▶ **Voids**—Two recognized general classes of voids exist:

• **Elongated tubular** type of microscopic size located along the glass fibers and designated "thread voids."

• **Large bubbles** or voids of microscopic size located between the yarns of the fabric or between plies, designated "fabric voids."

Two effects contribute to the formation of voids. Residual air may be incorporated into the laminate during forming and not be removed or be inadequately compressed, or vapors can be formed by the curing process, which boils off volatile components of the resin.

The cure? Proper control of the laminating process avoids both causes and gives a void-free laminate.

It is pretty obvious that a physically perfect material is going to have better properties strength-wise than a piece which is loaded with voids, pits, cracks, and the myriad defects in laminates formed by low-pressure or vacuum-bag molding. But a less-obvious defect was the factor which very nearly ruled out glass cloth polyester laminates for exterior use on military aircraft—rain erosion (AVIATION WEEK Apr. 17).

▶ **Neoprene Coat**—First solution of the problem of rain erosion was offered by the development of the void-free laminate. These showed a great superiority to the conventional laminates—for example, 8 to 20 times the resistance to erosion.

High-speed flight made conditions more severe, and so Goodyear developed a Neoprene coating to protect the laminate. An improvement by a factor of more than 100 resulted from the combination of the Neoprene coating and the void-free laminate.

It was not sufficient to use the Neoprene coating with conventional laminate, though. The void-free materials permitted easier application of a smooth Neoprene coating; they caused the Neoprene to withstand erosion better; they maintained structural integrity longer.

• **Physical strength.** As would be expected, void-free laminates showed substantial strength margins over the conventional types, when both were fabricated and tested with parallel techniques. A comparison of flexural and compressive strengths showed the void-free material to have 27 to 85 percent more strength than conventional laminates.

• **Water absorption.** The void-free laminates absorbed only about 36 percent as much water as the conventional in immersion tests lasting for either one or seven days.

• **Porosity.** To overcome porosity in conventional laminates, it had been necessary to vacuum-impregnate the cured material, to incorporate paper in the laminate, or to use coatings. But void-free laminates have been successfully used as pressure vessels because of their very low porosity.

• **Transparency.** Void-free laminated material is quite transparent. This results from the similar indices of refraction for resin and glass fibers.

The most important application of this property is in quality control, because a quick visual inspection can detect any of the common faults, other than voids, which might occur.

With sandwich structures, the core and bonding of the core can be checked visually; honeycomb cores can be examined for resin-filled cells, or for lack of bonding.

▶ **Advantages**—General results of Goodyear's investigation show the void-free laminates to be superior to the conventional on these counts:

• **27 to 85 percent** improvement in physical strength.

• **8 to 20 times** better in resisting rain erosion.

• **Non-porous** and impermeable to fluids and gases.

• **Absorption** of only about one-third as much water.

• **Pit-free,** non-soiling surfaces.

• Transparent to permit easy visual inspection.

New British Cabin Air Conditioner

An all-purpose air conditioning truck which "plugs in" to aircraft on the ground promises to be the British solution to the problem of providing a comfortable cabin for passengers as they board an airplane. This truck combines in a single unit all the functions necessary to air condition an aircraft cabin.

The unit, manufactured by Sir George Godfrey & Partners Ltd., operates on the air cycle principle. It is capable of either heating or cooling air, increasing or decreasing its humidity, spraying anti-pest compounds into the cabin and providing pressure for pressure testing the fuselage.

British Overseas Airways Corp. cooperated in the design of the truck. The company was planning to fly a unit in a York freighter to Calcutta and Karachi for service testing.

Ground air conditioning of aircraft is receiving increased attention by U. S. carriers. It was discussed at great length at the recent Air Transport Assn. Engineering and Maintenance Conference at Kansas City. American engineers agreed that airline managements soon would provide more funds for the purchase of such equipment to cater more completely to passenger comfort.

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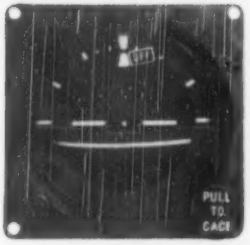
- COMPLETELY SELF-CONTAINED—low weight and simplified installation.
- SIMPLIFIED CONSTRUCTION—maintenance costs reduced to a minimum.



There's a new outlook on Horizons! The latest Eclipse-Pioneer Attitude Horizon Indicator is a brand new instrument that incorporates eight major features of utility, reliability and simplicity. From any attitude this Horizon will contribute to the efficiency of your operation. Check its features and you'll see why it's new, and how it has been engineered for you, your airplane and your flight.

Another example of the developments that have made Eclipse-Pioneer the leader in its field.

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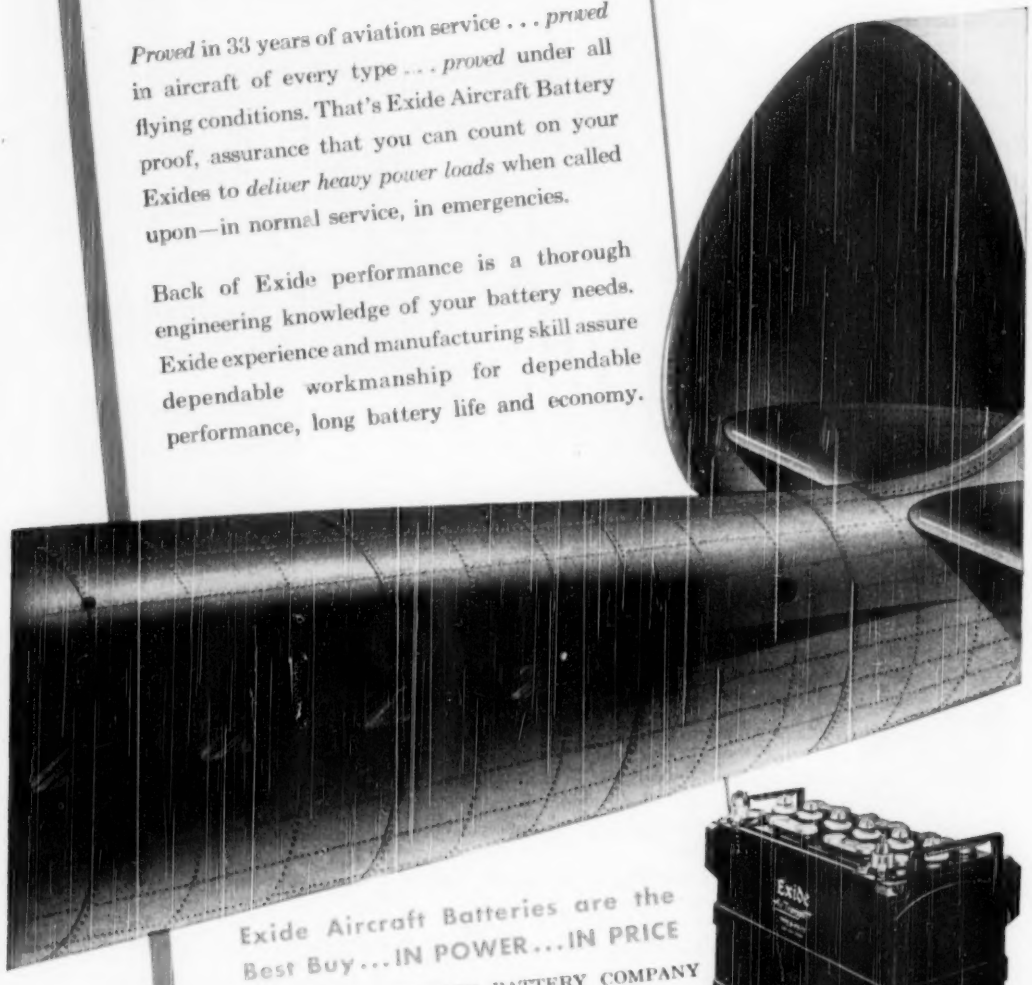

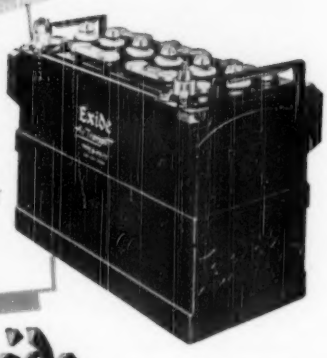

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Exide AIRCRAFT BATTERIES

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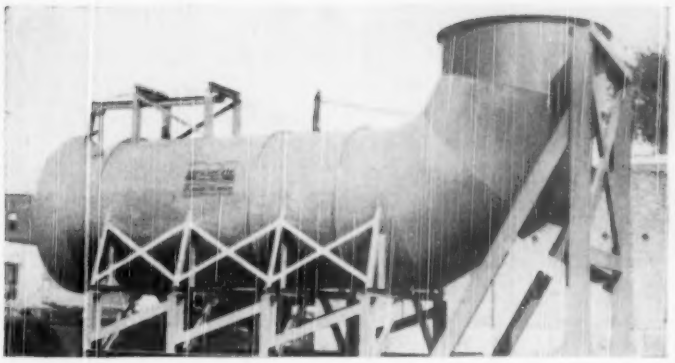

Muffler Swallows Turbojet Noise

A portable muffler, which can be pushed up against the tailpipe of a jet plane to cut down noise while the engine is being run up on the flight line, has been developed by Industrial Sound Control, Inc., Hartford, Conn.

The muffler looks like a large stovepipe placed horizontally, with an elbow at the aft end open to the sky. The jet engine is attached to the straight end so that by the time sound reaches the aft end, it is subdued to about the level of street noise, the manufacturer reports.

Inside of the pipe has an hexagonal shape with the top surfaces containing tiny perforations similar to those in an acoustically treated ceiling. Noise travels through these perforations to sound absorbent material, then through another perforated plate into an arched resonating chamber.

Perforated tubing to spray water for cooling purposes runs around the inside of the pipe.

This tubing circuit is formed into rings spaced several feet apart. The water spray also helps break up the sound.

The mufflers are designed to withstand temperatures up to 4000 F. without precooling, says the maker, this feature eliminating "the need for excessive water consumption which was a handicap to early attempts at jet sound control."

Offer Finding Guide To German Patents

Copies of German patent applications submitted during the war now can be easily obtained by U. S. firms. The Office of Technical Services of the Department of Commerce has announced the availability of a "finding" guide for these documents entitled "Subject Outline of the Unpublished Applications for Patents Filed at the German Patent Office–1940-1945."

The guide is a subject index to 200,000 applications filed during this period. It divides them into 13 major industrial groups, 89 classes and about 500 subclasses.

The new guide was compiled by the Association for the Diffusion of Documentation, Paris, France. OTS translated it for American use.

The Association is offering, for a small fee, microfilm copies of complete patent applications. Fee not only covers reproduction costs, but the task of locating the application from about 1000 reels on which they were copied.

Firms desiring to obtain further information on patent applications in their fields of interest may purchase German-language abstracts in the form of printed "PB" volumes which are listed in the new finding guide.

Better Screen Grids For Jet Air Intakes

An improved metal screen grid for protecting air intakes of turbojet engines has been developed by the Aeronautical Research Laboratory of the University of Kentucky, under supervision of the Air Material Command.

The new grid has stopped 50-cal. shell casing from entering air inlet ducts at speeds up to 625 mph. Penalty in using the device is an engine thrust loss of about 6 percent. This compares to protective grids now used which prevent entrance of foreign objects at speeds around 275 mph. and cause a 4 percent loss in thrust.

AMC engineers believe, however, that the final grid developed under the project will be able to stop casings at impact speeds up to 700 mph. with a thrust loss of less than 4 percent.

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Giant Hydropress Built for Lockheed

An 8000-ton hydraulic press, said to be the largest in the world, is being built for Lockheed Aircraft Corp. Fabricator is the Birdsboro Steel Foundry and Machine Co., Birdsboro, Pa.

The Burbank, Calif., company reportedly will use the press to stamp out hard-to-work aluminum alloys and stainless steel sheets.

The equipment is designed to take sheets of aluminum alloy ½-ft. thick, 10 ft. wide and 30 ft. in length. Maker cites the press as "an example of the high capacity fabrication equipment needed to produce high speed aircraft of the future."

An unusual feature of the mammoth device according to Birdsboro, is its flexibility. One man can push-button operate the machine, change pressure, sequence of operations and speed. It is designed for drawing and forming work requiring mating dies, for stretch-forming and for rubber pad work. Press will be as high as a 3-story building and with its foundation will weigh more than 3½ million pounds.

Flame-Retardant Developed by Martin

A new compound designed to make fabrics flame-resistant has been developed by the Glenn L. Martin Co., Baltimore, Md.

Product is a protective resin, called "HPM," which was developed primarily to meet the need for flame-resistant curtains and draperies in the Martin 2-O-2.

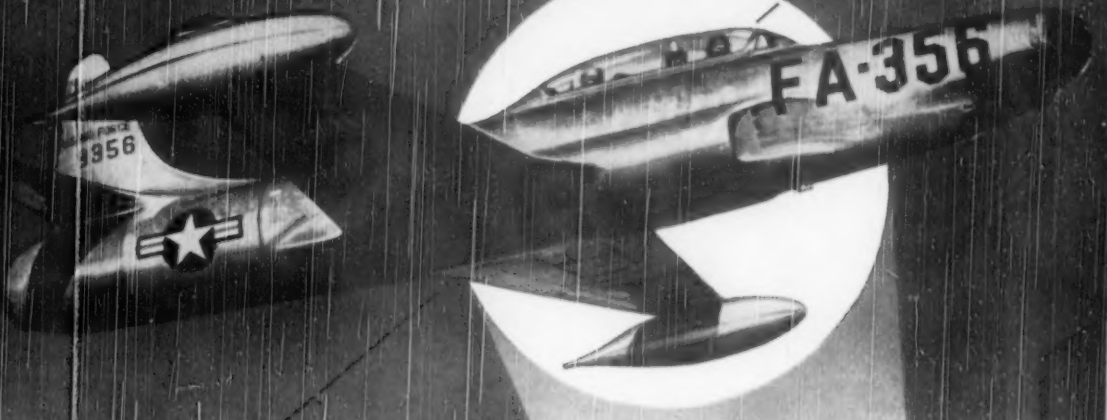
Advantages claimed for the compound is that it is durable enough to withstand normal laundering and dry-cleaning and does not add noticeably to weight of fabrics. Martin says fabrics treated with this agent remain pliable and soft.

It has licensed the product to E. I. du Pont de Nemours for further research work.

This firm is trying to develop a production process to manufacture it commercially. Martin says preliminary tests indicate the compound can be used with clothing fabrics and other textiles and that it is specially well adapted to meet the Army's flame-resistance requirements for clothing materials.

Du Pont discovered and now is marketing a durable flame retardant called "Erifon" for treating cotton and rayon fabrics. According to Martin, the new product is expected to complement Erifon.

VISIBILITY



by Swedlow

F94 Lockheed's new jet fighter for U. S. A. F. is designed to fly and fight in pitch darkness, with high-altitude interception of enemy aircraft as its principal function. For quality and dependability, a SWEDLOW produced acrylic enclosure was selected to protect the pilots and navigators of this latest Lockheed contribution to the American aircraft industry.

15 YEARS OF PIONEERING IN ACRYLICS... RECOGNIZED SPECIALIZATION IN AIRCRAFT

...plus perfection in optical properties...these are factors in making SWEDLOW a part of many notable developments in the aircraft industry.

We shall be glad to assign a staff engineer to work with you in any applications in industry using glazing materials.

Among other leading aircraft companies in whose latest achievements SWEDLOW skill in acrylics had a share are . . . . .

- **Boeing Airplane Company**
- **Consolidated Vultee Aircraft Corp.**
- **Hiller Helicopters, Inc.**
- **McDonnell Aircraft Corp.**
- **North American Aviation.**
- **Northrop Aircraft, Inc.**

We also serve the industry with improved fuel cell backings in accordance with applicable Air Force, Navy and customer specifications.

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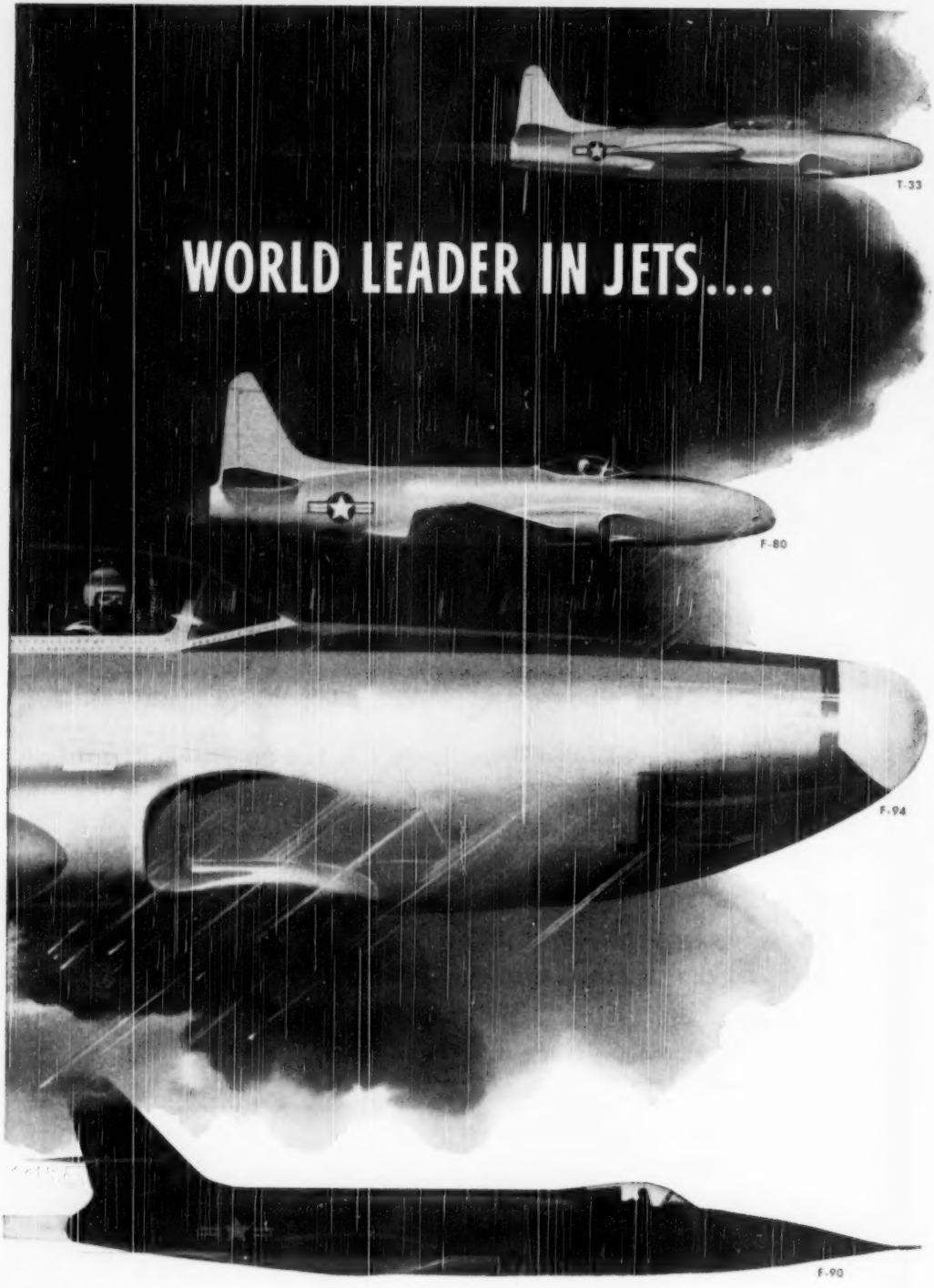

T-33
WORLD LEADER IN JETS....
F-80
F-94
F-90

LOCKHEED

PRESENTS THE F-94

The largest producer of jet aircraft *in the world* is the Lockheed Aircraft Corporation.

More jet-propelled airplanes have come from the Lockheed plant than from any other factory. In fact, Lockheed has built jets at the rate of at least one a day—*every day for more than five years.*

Lockheed produced the first U. S. operational jet airplane—the famous F-80 *Shooting Star*, long the backbone of America's fighter defense.

Lockheed leads in the jet training program, too, producing the two-place T-33 and the TO-1 jet trainer for the Air Force and the Navy. These are the only jet trainer airplanes produced in America today.

And to win and maintain air superiority *behind* enemy lines, Lockheed has built the long-range, twin-jet F-90 Jet Penetration Fighter.

Now, for high-altitude interception, Lockheed is building the new F-94 All-Weather Interceptors, capable of around-the-clock, around-the-calendar defense.

These dependable Lockheed Jets have many mutual advantages—speed, strength and producibility. And the experience obtained in the design, development and manufacture of these practical jet airplanes is invaluable in the Lockheed laboratories where the planes of the future are taking shape today.

LOCKHEED

Aircraft Corporation, Burbank, California

Look to Lockheed for Leadership

British Turbine Progress Outlined

'Flight' editor feels water-methanol injection and afterburning open way to 10,000-lb.-thrust engines.

British views on key factors of gas turbine power for aircraft were offered by G. Geoffrey Smith, directing editor of "Flight," at the recent National Aeronautic Meeting of the Society of Automotive Engineers, in New York.

Comments made by this well-known English writer on jet propulsion topics, who obviously is familiar with British engineering thinking, covered aspects of development costs, thrust, fuel consumption, ignition, compressors, power augmentation, and technical liaison between U. S. and England.

Acknowledging the enormous progress made in gas turbine power in a comparatively short time in both countries, Smith noted that the Whittle engine's simplicity is being sacrificed to attain increased efficiency.

Emphasizing that it requires a large organization with access to extensive proving facilities, he held that to bring a modern high-power aircraft turbine through design, construction and development phases to the stage of service reliability may run as much as $8.5 to $11 million, and span a period of 3 to 4 years. And he said that no company could afford to produce a specifically civil type turbine plant unless it had potential military utility, hence, military backing.

▶ **Higher Thrust Near**—Smith revealed that with the aid of water-methanol injection and afterburning "we can claim to be on the threshold of the achievement of 10,000-lb. thrust from a single unit."

He said the military had not abandoned the centrifugal type turbojet and cited the de Havilland Ghost as being actively developed for the RAF's new high-altitude fighter, the DH Venom. He also mentioned the 6250-lb.-thrust Rolls-Royce Tay as being more than 400 lb. lighter than the axial Avon.

Cost of development, production and maintenance of the centrifugal compressor is less than for the axial, it is more rugged, less vulnerable to icing, less susceptible to damage from foreign matter passing through. The efficiency figure, he said, was 79 or 80 percent.

Component efficiency of axial type was set at about 88 percent. Employing a higher compression ratio, a lower specific rate of fuel consumption is possible—a reduction of 12 to 15 percent.

He noted, too, that turbine-powered airliners now flying—Comet, Jetliner, and Viscount—had centrifugal type engines.

▶ **Axial Pushed**—But major emphasis, he said, was nevertheless being placed on new axial-flow types for military service, with current attention being focused on the Rolls-Royce Avon and the Armstrong Siddeley Sapphire. These axial-flow jets, now Britain's most powerful types, probably will be major factors in that country's bomber plans.

The Meteor, with twin 6250-lb.-thrust Avons, gives that fighter a 10,000-fpm. rate of climb, he said.

He had praise for our North American F-86 with its GE J-47 jet, and for the slim Allison XT-38 turboprop unit.

▶ **Fuel Factor**—Smith said that "for a particular aircraft it would be more informative to quote the rate of fuel consumption 'for all purposes'," that "the day has gone in high-altitude, turbine-propelled aircraft to quote bare engine fuel consumption; we must recognize what is saved in the matter of auxiliaries and thus offset differences. . . ." He added that axial flow compressors were more sensitive to bleeding for auxiliaries than were the centrifugal types.

Specific consumption of the bare engine, he said, did not necessarily afford the best indication of suitability for a specific job. He held that some technicians compare turbines with piston engines and tend to disregard savings in auxiliary services. The turbine powerplant which "can furnish cabin pressurization and de-icing, and incidently save 500-600 lb. weight of independent auxiliaries, shows to an advantage in this respect over the piston engine."

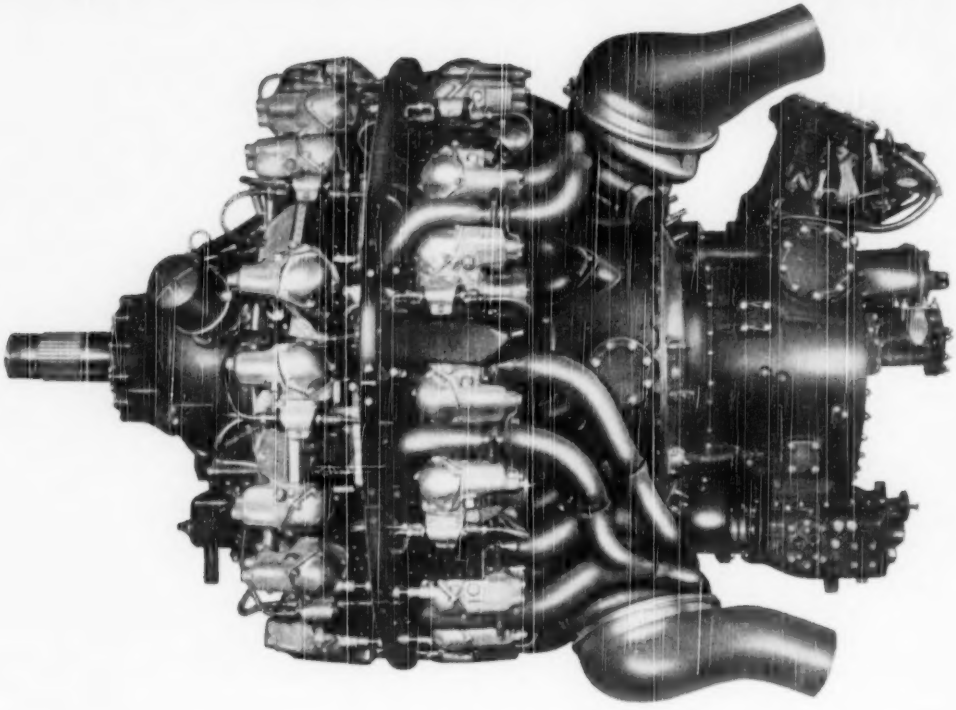
▶ **Savings**—Smith disclosed that a British laboratory had reduced the rate of fuel consumption 9 percent in 3 years, through improvement in combustion techniques and auxiliaries.

Further benefits may be expected through current research on spray characteristics, droplet size, atomized spray distribution and aerodynamic, mechanical and metallurgical improvements. These benefits, coupled with others from study of individual components may offer a further 15-20 percent reduction in the fuel specific rate in the next 3 years. Aim is 0.8 lb./lb. thrust/hr. sea level static and about 1.1 lb./lb./hr. at 600 mph. in the stratosphere.

It was disclosed that with improvements in the Comet's Ghost turbines, de Havilland's Major F. B. Halford estimates a further 5 percent reduction in specific fuel consumption figures.

Smith said that in test runs, the Comet has been flown for a stretch of

The WRIGHT 3250 H.P. Turbo-Cyclone 18



Another "First" for Wright Engineering

Mount three blowdown turbines on a piston engine. Utilize the exhaust gases from the piston engine to turn the turbines. Then count the blessings . . . higher power . . . lower fuel consumption . . . longer range . . . for military and commercial operations.

▶ The Wright Turbo-Cyclone 18—rated at 3250 horsepower—is the first and only aircraft "compound" engine to pass a military model test, go into production and fly in a production airplane.

A Tribute from the Navy

▶ The Turbo-Cyclone 18 now powers the U.S. Navy's long-range patrol bomber—the Lockheed P2V-4—and the Martin P5M-1. It brings to these aircraft the proved reliability and operating economy of the Wright Cyclone 18 PLUS the lower weight and compactness of the gas turbine.

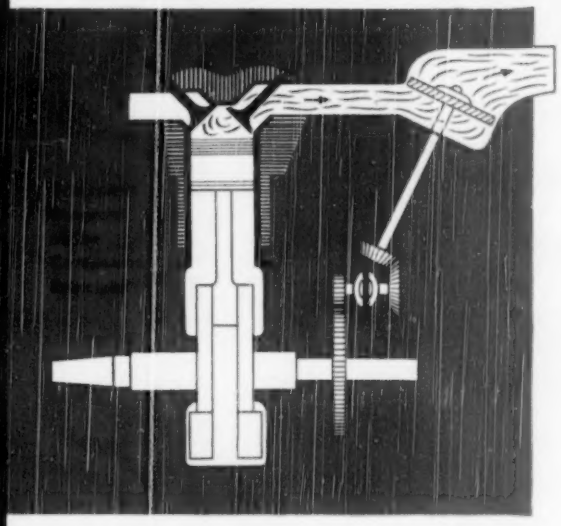
Endurance—Range—Striking Power

▶ The selection of the "compound" engine for naval aircraft primarily designed to spearhead anti-submarine defenses is a tribute of which Wright Aeronautical is justly proud. For in anti-submarine warfare operations, endurance, long-range and heavy striking power are basic requirements . . . and the choice of the Wright Turbo-Cyclone 18 is based on its unique adaptability to these exacting requirements.

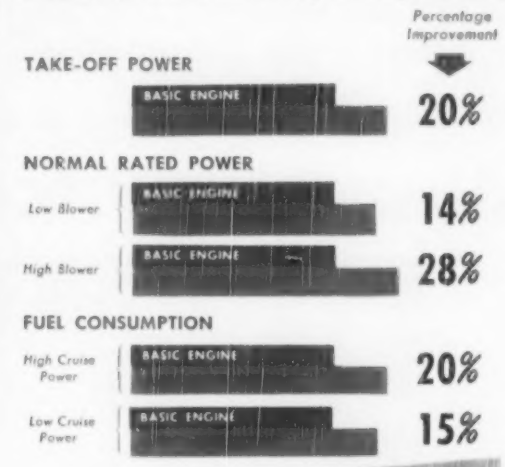
3000 hours successful test time

▶ Behind the Turbo-Cyclone 18 are over 3,000 hours of experimental ground and flight tests . . . plus the millions of flight hours amassed by the basic Cyclone in military and commercial service.

FIRST PRODUCTION
COMPOUND ENGINE



BONUS ... in Dollars, Miles, Pounds



MORE POWER TO THE NAVY

Turbo-Cyclone 18 now in production for Lockheed P2V-4

Wright Turbo-Cyclone 18 power is *compounded*. The energy of the exhaust gases from the Cyclone's eighteen cylinders—usually wasted on the air—is now recovered —harnessed to the three blowdown turbines and fed back to the crank shaft. The energy thus recovered is added to that generated by the piston engine's own fuel supply. Result . . . from the same amount of fuel comes a wide choice of advantages.

The Advantages "Compounded", Too

Specific fuel consumption reduced as much as 20%.
Range increased 20% on same amount of fuel.
Payload much increased by lower fuel consumption.
Power increased 20% without increase of fuel.
Lower specific weight . . approx. 1 lb. per h.p. developed.

No Excess Weight to Fly

Additional bonuses . . . ease of installation, maintenance, operation . . . no added controls, no special training of crews, noise suppression.

WRIGHT IS PIONEERING IN *ECONOMY*

Apart from differences in operational requirements, the military and commercial operator share the same need for optimum economy and performance in long-range aircraft. The Turbo-Cyclone 18 is the most advanced aircraft power plant yet developed to fulfill these requirements. It reflects Wright Aeronautical's present and foreshadows its future leadership in creating new and more economical sources of power for air progress.

Wright Aeronautical Corporation, Wood-Ridge, New Jersey

CURTISS WRIGHT

5¼ hours with standard tankage, and that the next version will provide more wing tankage (and a bogey landing gear). Tests have been at 35,000-40,000 ft., but, he says, the Comet will go to 45,000 ft.

▶ **Ignition**—Smith commented on the Royal Aircraft Establishment-developed high energy ignition system. It is not yet in general service use, but has been successfuly tried in both test cell runs and in flight. Weight of this equipment, with screened plug lead is approximately 10 lb.

The device has enabled discarding of the torch igniter and its auxiliary fuel spray, since the electrical discharges produced (1/sec.) have such high energy and short duration, that each can create ignitable conditions in the combustion chamber—vaporizing a sufficient quantity of the main fuel spray, then igniting sufficient volume of the resulting mixture to produce a general "light-up."

Because electrode erosion of the orthodox high-voltage ignitor plug was too rapid, a surface discharge plug with a large electrode area was chosen— two heat-resisting, circular steel electrodes separated by a .02-in. annular gap housing compressed mica flush with electrode surfaces. The mica is coated with a thin layer of carbon and in normal operation, the plug's position in the chamber maintains this deposit.

An induction coil, operated by a vibrator from a 24v. dc supply, repeatedly charges a condenser through a sealed spark gap until condenser voltage increases to about 2000v. Then, the condenser discharges through the sealed spark gap, an inductance and the plug, all in series. Discharge duration is about 50 microseconds; peak current about 1500 amp.

In test cell trials, successful ignition has been achieved over a range of limiting combustion conditions, Smith said, from high pressures equivalent to high flight speed at low altitude to low pressures at high altitude.

In flight trials, successful relights were obtained with several turbines up to about 35,000 ft.

▶ **Augmentation**—Because afterburning equipment imposes a penalty of 2-3 percent on cruise fuel consumption, Smith said that the British favor water-methanol injection for civil aircraft, particularly for takeoff. Benefit gained is estimated to be a maximum of 10-12 percent. A higher value would be considered to indicate that compressor and turbine characteristics were poorly matched.

▶ **Turboprops**—Smith said that Britain expects a progressively stronger challenge from America in the turboprop field.

He emphasized British confidence in the relatively low-powered turboprops for civil use, citing the Mamba and the Dart.

First British turboprop engine to see regular military service, he said, would be the Armstrong Siddelev Python, now being produced for carrier-based strike planes.

The coupled Mamba is being used in new anti-submarine aircraft. In this service, Smith said, "the coupled turboprop, offering cruising economy and high maximum power for closing on the target, appears ideally suited."

• **U. S.-British Cooperation**—Stressing the enormous benefits to be derived from technical cooperation between the two countries, Smith held that security considerations must not be allowed to stifle liaison. He expressed belief that Britain might consider experimental installation of their most advanced turbine units in our "equally advanced airframes."

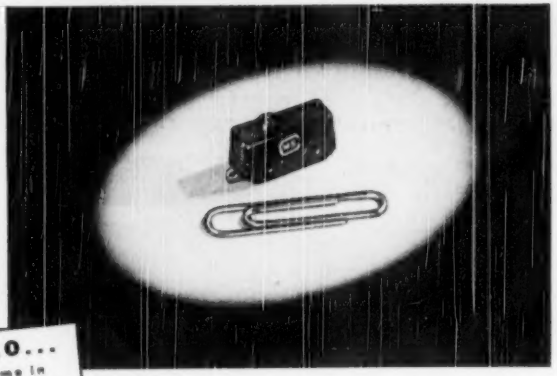
He said that continued technical liaison could materially reduce the critical period between initial inception of turbine power units and delivery for service.

Standardization of all minor parts and accessories should be advanced, so long as it did not impede design, he said, guarding against any standardization of ideas.

Here's the Subminiature...

the smallest, lightest switch

in the MICRO SWITCH line!



MICRO... first name in precision switches

Where small space and light weight are important factors, this extremely small MICRO Subminiature Switch meets many tough requirements.

The Subminiature measures 19/64" long by 3/8" high by 1/4" wide . . . has less than 1/15th of the volume and weight of the standard MICRO snap-action precision switch.

Electrical capacity tests indicate a rating of 5 amperes, 115 to 230 volts a-c; and 2 amperes, 28 volts d-c.

The MICRO Subminiature is enclosed in a plastic case and provided with pin plunger actuator. The circuit arrangement is single-pole, double-throw. Terminals are of solder lug type. Call or write MICRO SWITCH, Freeport, Illinois, or any branch office for complete information.

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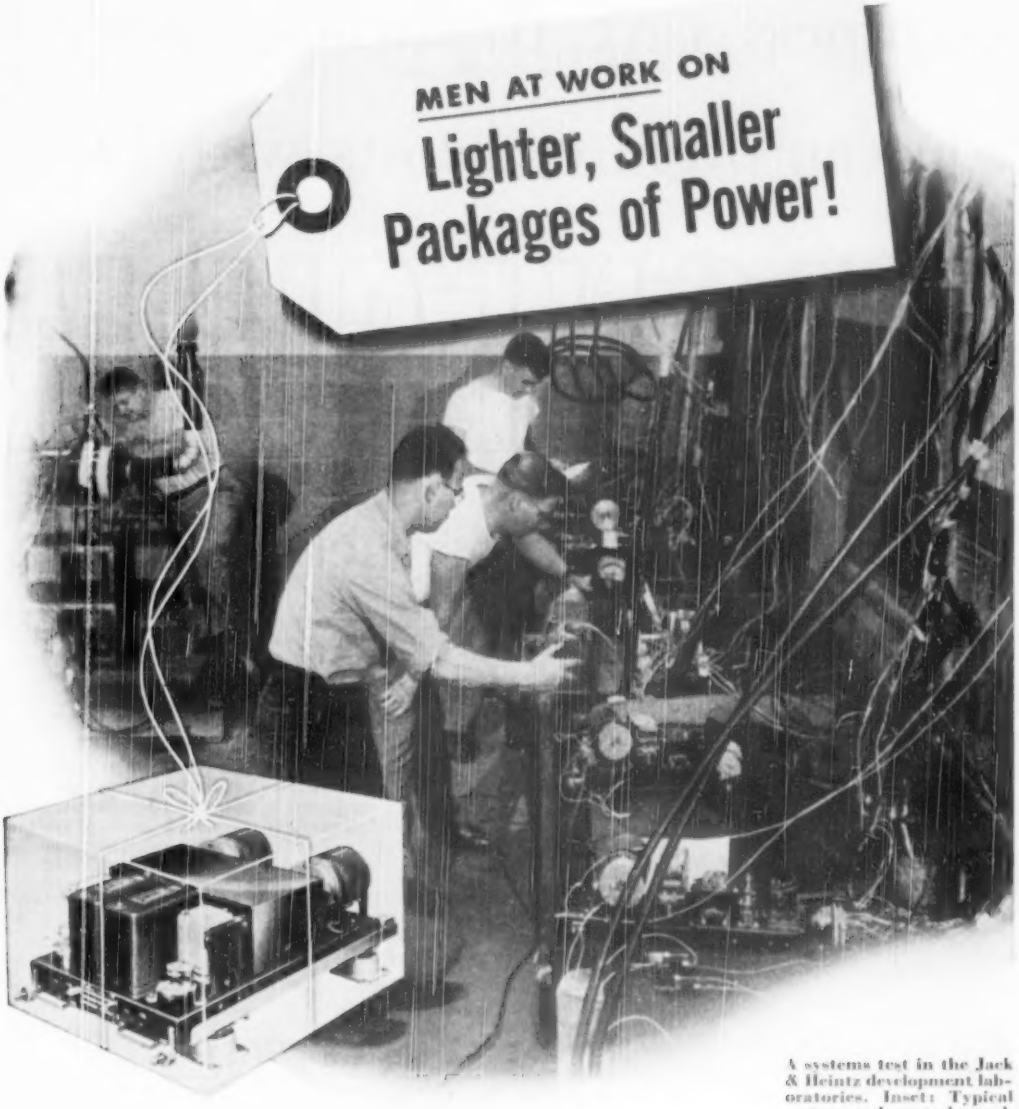
Lighter, Smaller Packages of Power!



A systems test in the Jack & Heintz development laboratories. Inset: Typical system and control panel.

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For dependability, look to Jack & Heintz—*the aircraft electrical specialists*—to design, test and produce lighter, smaller packages of power to meet *your* requirements!

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MAGNESIUM

the world's lightest structural metal!

The extra lightness that you get only with magnesium has meant improved performance wherever magnesium has been used. But dead weight reduction isn't the whole story—many leading aircraft designers are finding that *the proper use of magnesium can also mean sizeable reductions in fabrication and assembly costs.*

Finished magnesium castings are not only lighter, but often cheaper than those in other materials because of the ease with which they can be machined. A new high strength extrusion alloy with low notch sensitivity makes it possible to replace many costly built up beams with low cost, efficient magnesium extrusions.

The low specific gravity of magnesium means thicker skin can be used. The greatly increased stiffness obtained reduces the number of stiffeners and formers and permits simplification of the structure with attendant reduction in fabrication costs.

For more detailed information about the use of magnesium in aircraft, write Dept. MG-77 in Midland.

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Magnesium . . .

Available in extrusions, castings and sheet

A high strength-weight ratio combined with maximum lightness is common to all forms of magnesium. This desirable combination has been the answer to many difficult design problems. Furthermore, magnesium is readily worked by established techniques.

Fuel Control Studied

A special laboratory for studying problems of fuel system control in high-speed planes has been set up by Chance Vought Aircraft in Dallas, Texas.

United Aircraft Corp.'s fighter plane division built the fuel test lab by converting a paint touch-up building used during the war by North American Aircraft, Inc.

CV engineers say that until recent years this type of facility would not have been necessary. But with the advent of high-speed, high-altitude craft, the center of gravity has become more critical. The new lab should aid engineers in fuel system design studies and in finding answers to problems of controlling cg. shift within close limits while fuel weight changes at various points in the plane during flight.

The new lab will permit testing of complete fuel systems. It is equipped with a 1000-gal. underground tank and has automatic fire protection.

Aircraft Static Data

Recommended procedures for static grounding of aircraft during fuel servicing are included in a report submitted by the Committee on Aviation and Airport Fire Protection of the National Fire Protection Assn. at its recent annual meeting in Atlantic City, N. J.

Recommendations call for positive grounding to drain static charges—in place of previous procedures of merely equalizing static charges on aircraft and fuel trucks.

The report states that static charges will drain safely where ground resistance is as high as one megohm. This usually permits use of tiedown bolts. Special grounding electrodes may be necessary where resistances are abnormally high.

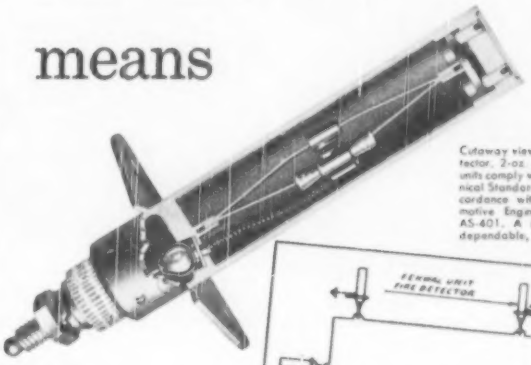
Detail information on the development of electrostatic charges on aircraft during flight, at rest, and during servicing operations are given in the NFPA recommendations. The Association's address is 60 Batterymarch St., Boston.

Weathers Lights

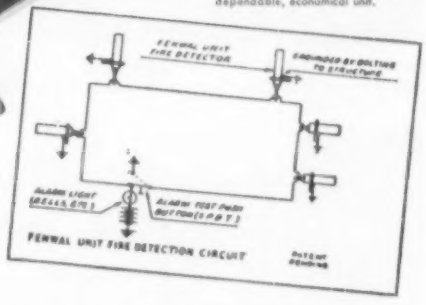
A "smog box" at Westinghouse Electric Corp.'s Lighting division at Cleveland, Ohio, is being used to put outdoor lighting equipment through the paces to see how it will stand up when it is put into actual service. Lighting units are given the equivalent of 20 years of weathering in about 1000 hr. of accelerated proving in corrosive atmospheres. Data should prove interesting to airport operators and equipment engineers.

The smog box uses a salt fog which affects metal in the same manner as salt air at an ocean beach, or the sulfur-content air of a major industrial area.

Airline after airline is learning what positive fire detection means



Cutaway view of Fenwal Fire Detector. 2-oz. hermetically sealed units comply well within CAA Technical Standard Order C-11 in accordance with Society of Automotive Engineers, Specifications AS-601. A rugged, long-lived, dependable, economical unit.


FENWAL UNIT FIRE DETECTOR
GROUNDED BY BOLTING TO STRUCTURE
ALARM LIGHT
ALARM TEST PUSH BUTTON
FENWAL UNIT FIRE DETECTION CIRCUIT

Recommended single conductor loop circuit operates detectors even if circuit is accidentally broken. No averaging effects . . . a double break eliminates detectors between breaks only leaving other detectors independently operative. Single push-button circuit check.

The Fenwal Aircraft Fire Detector has been designed for positive detection of fire or dangerous overheat conditions. The unit combines the best features of rate of rise and fixed temperature devices.

Fenwal Fire Detectors are permanently calibrated. Hermetically sealed stainless steel unit. Easy to install; single terminal rules out connection errors. No bulky panels, relays, supervisory instrumentation to buy or maintain.

Fenwal, Incorporated, 126 Pleasant Street, Ashland, Massachusetts.

Further information on request

Fenwal

TEMPERATURE CONTROL ENGINEERS

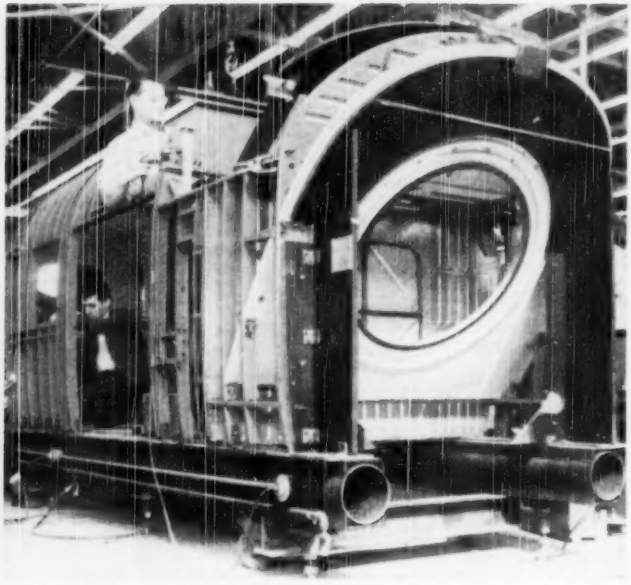
THERMOSWITCH*

*Reg. U. S. Pat. Off.

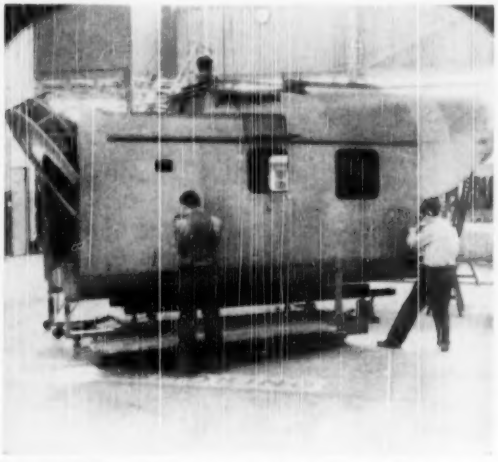
Aircraft Fire and Over-Heat Detectors

SENSITIVE...*but only to heat*

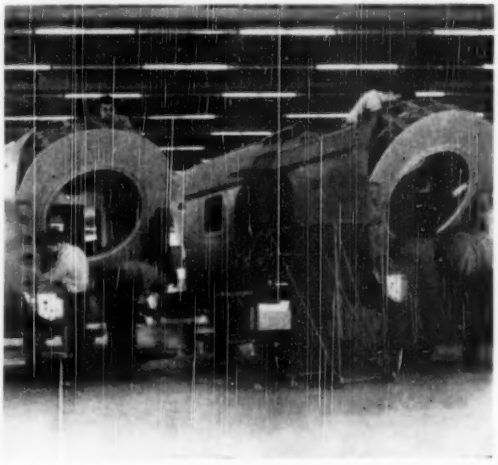
ALUMINUM ARCHES for the H-19's skeleton are bolted to the fuselage jig. Note ample working room.



NEARLY COMPLETE CABIN FRAME gets instrument panel plate installed. The circular aluminum section is firewall baffle for 600-hp. Wasp engine.



LIFTED ONTO 190-gal. fuel tank, which is riveted into the cabin, the fuselage gets its skin fitted.



ABOUT 40 PERCENT COMPLETE, two fuselages move along the line. Flight decks have not yet been added.

A Copter Grows At Sikorsky

Sikorsky Aircraft has been busy on an order for five of the big Air Force H-19A air rescue copters shown in production line photos above. H-19 has normal gross weight of about 7000 lb. and a military payload of about 2800 lb.

In spite of its size, it can be readily disassembled for stowage in a Fairchild C-82 Packet. Ten passengers can be carried in the roomy cabin in addition to a crew of two on the flight deck. Unique nose mounting of the 600-hp. P&W Wasp engine permits easy access for maintenance and replacement through a pair of clam-shell nose doors.

Sikorsky also has a Navy order for ten of the craft designated H04S.

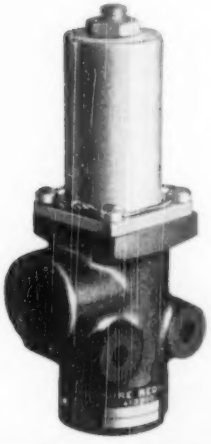
Bendix-Pacific

HYDRAULIC PRESSURE REDUCER VALVES to meet your EXACT requirements

Standardized Bendix-Pacific Hydraulic Pressure Reducers are available from Pacific Division, Bendix Aviation Corporation to meet a wide range of applications for both 3000 and 1500 P.S.I. systems. Three of the valves are illustrated here. This division also offers its engineering assistance for the design of special valves, or the adaptation of Bendix-Pacific standardized valves to meet your exact requirements.

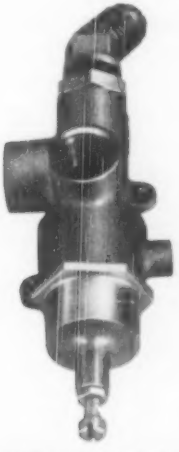
PRESSURE REDUCERS AND RELIEF VALVES

Assembly No. 411590
Standard Unit set at 1250 ± 50 P.S.I.
Assembly No. 411350-2
1000-2000 P.S.I. range of adjustment—low rate spring
Special versions to meet your exact requirements



PRESSURE REDUCERS WITHOUT RELIEF VALVES

Assembly No. 413200
1500 P.S.I. inlet 1250 P.S.I. outlet
Assembly No. 547950
1500 P.S.I. inlet 450 P.S.I. outlet
Assembly No. 547950-2
1500 P.S.I. inlet 150 P.S.I. outlet
Special versions to meet your exact requirements



PRESSURE COMPENSATED REDUCING VALVES

Assembly No. 410260
1250-1400 P.S.I. plus approx. 26:1 compensation
Assembly No. 410630
1000-1200 P.S.I. plus approx. 8:1 compensation
Hydraulic pressure varies with controlling pressure. Typical application: hydraulic pressure proportionate to fuel pressure for in-air refueling.

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Making Executive Travel Safer

FSF director tells CAOA: Pilot proficiency should be maintained, but the boss may need some training too.

By Alexander McSurely

Executive air travel in multi-engine planes already has a good record. But corporations owning planes can make it better still.

Prescriptions for even safer business air travel in the future was given last week to members of Corporation Aircraft Owners Assn. at Washington. Jerome Lederer, the director of Flight Safety Foundation, made the recommendations, with his assistant, Miss Gloria Heath, as his spokesman.

Prescribed practices for safer executive flying include:

- **Educate the boss** so that he doesn't demand the impossible from his pilot.
- **Adopt airline practices** for emergency procedures and equipment.
- **Require pilots** to maintain flight proficiency with periodic flight checks and instrument time.

Lederer's analysis of multi-engine executive plane records shows two fatal accidents in 1948 and four in 1949. During those same years domestic airlines averaged 400,000 hr. of flying for each fatal accident. If executive planes did as well, they would have had to fly 2,400,000 hr. in the two years. But no figures on the hours flown by business planes are available.

Warning against dangers of pressure placed on a pilot by an owner, to fly regardless of risk, was given. The boss should be trained to understand that executive flying is the most satisfactory and safe type of transportation, only when properly conducted.

List of "do's and don'ts" for owners prescribed by the air safety engineer includes:

- **Don't order** a flight when in the opinion of the pilot it cannot be completed safely and in accordance with regulations.
- **Don't insist** on the crew drinking hard liquor in flight or attending parties if flight is anticipated within 12 hr.
- **Do insist** that all newly employed pilots be properly and recently checked out.

Importance of maintaining pilot proficiency was emphasized by the fact that, according to Lederer's analysis, all but one of the six fatal accidents in 1948-1949 were attributable to pilot "inadequacy."

Too many pilots are their own judge of proficiency, Lederer contends.

But to backstop the pilot's own judgment, he recommends such things as: Regular instrument flight practice under the "hood" and in Link trainers; standard cockpit procedures, weather minimums varying with the competency of the pilot; regular check flights with competent check pilots; study of maintenance procedures by pilots, and a requirement of an airline transport rating for pilots of corporation aircraft.

The flight safety engineer points out the specific danger of overloading business planes, and recommends such safety procedures as: Backward seating, shoulder harness, stronger seats and fastenings, (emergency lighting, oxygen masks) marking fuselage with "chop in" lines for rescue crews, study of emergency evacuation procedures.

Don Nyrop, CAA deputy administrator, quoted CAA studies showing an increase of 141 percent in business flying in the three postwar years, as compared with a 55 percent increase for all types of flying except scheduled air carrier.

Sam Saint, Air Transport Assn. director of air navigation and traffic control, conducted a discussion on problems for executive pilots in the transition system of the all-weather instrument navigation system being developed by Air Navigation Development Board.

Arthur Godfrey, radio commentator, a consistent user of air travel, was awarded the association's 1949 award, for contributing most to the advancement of executive air travel.

William B. Belden, of Republic Steel Corp., Cleveland, continues as chairman of the CAOA, and N. F. Silsbee has been reelected executive director of the organization.

Addition of General Motors Corp., owner of one of the largest corporate fleets of executive aircraft in this country, to the membership of the association, was disclosed at the meeting. The association now includes as members over 80 firms, with more than 45 different types of business and industry represented. Their executive fleets include more than 150 airplanes, of which approximately 120 are multi-engine types.

Authorize Fields Near National Parks

Added stimulus to personal flying is seen in recently approved legislation making possible development of airports near the entrances of national parks and monuments. Contained in the new act is authorization of $2 million to the Department of Interior to carry out the program.

Several airport sites have been selected tentatively and are included in the Civil Aeronautics Authority's 1950 National Airport Plan, including a field to serve Yellowstone Park.

CAA recently agreed to include data on parks and monuments on the backs of its sectional charts, along with a statement requesting pilots to maintain at least 2000-ft. altitude so that quiet enjoyment of parks will not be disturbed.

SALESMEN VIEW SUPER NAVION

Ryan distributors look over the new 260 Navion during a sales meeting in San Diego where plans for 1950 were formulated. So far, it's reported, 260 demand exceeds production; deliveries are being quoted at 2-3 weeks from time order is placed. One of the main bottlenecks appears to be shortage of the new Lycoming engines. Deliveries of the Utility and De Luxe 205 are being handled immediately.

IAS Group Hears Lightplane Ideas

Suggestions vary from forcing air over foils by a blower system to building craft with flapping wings.

Landing and takeoff runs of personal aircraft may be sharply reduced by use of a blower system forcing air over the wing flaps. The maximum lift coefficient of a wing can be raised from 3.00 to 4.4 by using such a blower rigged to the power plant. That was the report of Kenneth Razak, director of the school of engineering, Wichita University, to the seventh annual personal aircraft meeting of the Institute of the Aeronautical Sciences at Wichita.

Testing an NACA wing section for the Office of Naval Research in the Wichita University wind tunnel, Razak reported, interior air was blown over the slotted flap and hinged nose of the wing surface. The results of the artificial wind over the flap were good, he said. But the system is worthless over the leading edge of the wing.

► **No Stalling**—Razak's calculations showed that a carrier-based plane with 30-lb./sq. ft.-wing loading, using the windblown wing, would have shorter landing and takeoff runs, and improved lateral control. He said that with the blower system, the wing will not stall out with ailerons and flaps down. He estimated that such a plane would need only 300 ft. of takeoff run instead of its usual 490 ft.; landing run would be reduced to 385 ft. from 925 ft.

Razak based his coefficient ratio of 4.4 on a tunnel test with flaps at 50 degrees, with artificial wind over the flaps only.

The blower-type system test of wing stabilization is the result of knowledge gained from the Germans after World War II. Razak said that experiments with intake or suction control of wings will be made next year.

Fred E. Weick, director of the personal aircraft research center at Texas A&M College, told the aircraft engineers that a set of specifications for dusting and spraying planes has been established under sponsorship of CAA and the Department of Agriculture, and high stress has been placed on pilot safety.

High-G resistant seats and the Cornell research recommendations for crash safety are being incorporated in an experimental plane now under development at the college.

► **Spray Specs**—Here are some of the specifications outlined by Weick for crop-dusting and spraying planes:

- **Easy and quick** maintenance.
- **All-metal construction.**
- **Better serviceability** of fabric.
- **Loads** from 800 to 1200 lb.
- **Easy loading** and easy change from dusting to chemical materials.
- **Good takeoff** on soft fields.
- **Operating speeds** of 68-80 mph.
- **Minimum speed** of 45 mph.
- **Endurance** of two-three hr.
- **Cessna-type,** vanadium-steel spring landing gear.
- **Light controls.**
- **Accurate flying** without fatigue.
- **Adequate control** at low speeds.
- **Good field** of vision.
- **Open cockpit.**
- **Low wing.**
- **Flat engine** with minimum of 185 hp., up to 300 hp.
- **Wing span** of 39 ft., with 7½-ft. chord.

► **For Average Man**—William B. Stout, Phoenix, Ariz., of Stout Research Laboratory, issued the old challenge to the group to build a plane that the average citizen can afford to buy and operate.

Stout said that while all modern aircraft are good as far as they go, their possibilities are limited. Only when the plane can do as many things, be as generally useful, and be as easy to own as a car, will the average man be able to buy one.

He said the only solution to this economy and simplicity of operation is a plane which flaps its wings and has the characteristics of a bird or animal.

"Someone with brains, vision and money should hire someone with brains to go after the flapping wing problem on a scientific research basis," Stout said. "The personal aircraft of the future will certainly have flapping wings."

Other speakers included Col. Hammond M. Monroe, head of the air division, research and development section, Army Field Forces, Fort Monroe, Va. He said that 8000 flying farmers "can't be wrong." He said that the manufacturers building planes for the farmers may be making a valuable contribution to the Army because both need a small, rugged airplane—the Army for use in support of combat troops—a plane that can land and take off from rough strips with certainty and safety. "I see no reason why the requirements of the flying farmers aren't the same as ours. I believe the Department of Defense should make such planes available to the Army."

ATS Elections

William J. Graham, vp and a board member of Pittsburgh Institute of Aeronautics has been elected new president of the Aeronautical Training Society, and Maxwell W. Balfour, president for three previous years, has been named vp. Wayne Weishaar was re-elected secretary for the sixth time.

Named to the board of directors were: E. Merritt Anderson, Hugh Copeland, Albert I. Lodwick, Harry S. White, Maj. C. C. Moseley, Frank Hulse, Oliver L. Parks, Clyde E. Brayton, Beverly E. Howard, Maj. William F. Long, Ray Hylan, and Graham and Balfour.

ATS members operate about 120 aircraft bases in 40 states.

State Tightens Its Crop-Dusting Code

Crop dusters in the state of Washington are going to have to meet more rigid requirements.

The state's crop dusting code has been revised to require each commercial sprayer or duster to have on his payroll at least one pilot with 1000 hours of solo including at least 200 hours in dusting or spraying.

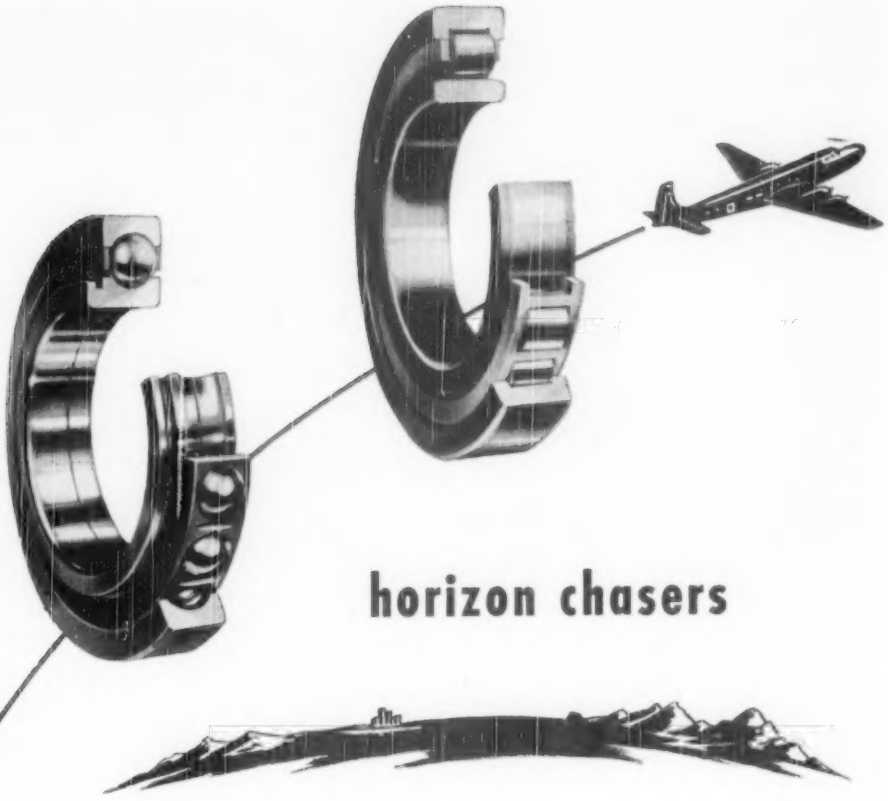
The code, which was re-written by the Washington State Aviation Assn. working with the state areonautics commission, exempts flying farmers treating their own lands. But if they use chemicals designated as "harmful and dangerous," they will have to get a season's waiver from the commission.

BRIEFING FOR DEALERS AND DISTRIBUTORS

► **1948 Aircraft Use Report** — The Civil Aeronautics Administration has come out with a comprehensive report on aircraft use in 1948. The agency notes that private flying decreased by seven percent during that year over the 16,334,000 hr. recorded for '47. In those days, instructional use of private planes averaged 282 hr. yearly, pleasure flying accounting for 58 hr. per plane.

► **Helicopter Explorations** — A newly formed syndicate, Helicopter Explorations Co., headed by Karl J. Springer, is planning to spend about $150,000 this year hunting minerals in northern British Columbia. Craft will be fitted with Geiger counters and other mineral-detecting equipment. Prospectors will be landed near any promising formations picked up by these instruments.

► **Navion Reps Tour U. S.**—Southern Ryan distributors are being visited by factory specialists making free on-the-spot inspections of Navions for customers, similar to plan inaugurated by Beech last year. Continental Motors is coordinating a field service trip of its own with the Ryan schedule. About 40-50 percent of plane owners in each area are taking advantage of the inspections.



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Day in, day out, the aviation industry pushes back the horizon . . . develops safer aircraft with speeds that outrace sound . . . with cruising ranges that make circling the globe just another milk run. And in these modern planes . . . whether they're fighter jets or high-speed commercial liners . . . every functioning part must take a terrific beating . . . must withstand the punishment of greatly elevated temperatures and high rotative speeds. SKF keeps pace with the steady march of aviation progress . . . through constant research and cooperation is able to supply the right ball and roller bearings for the task at hand . . . bearings produced under a system of rigid controls that insures consistently uniform dependability.

SKF *Industries, Inc., Phila. 32, Pa.*

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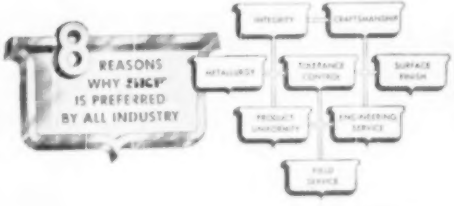
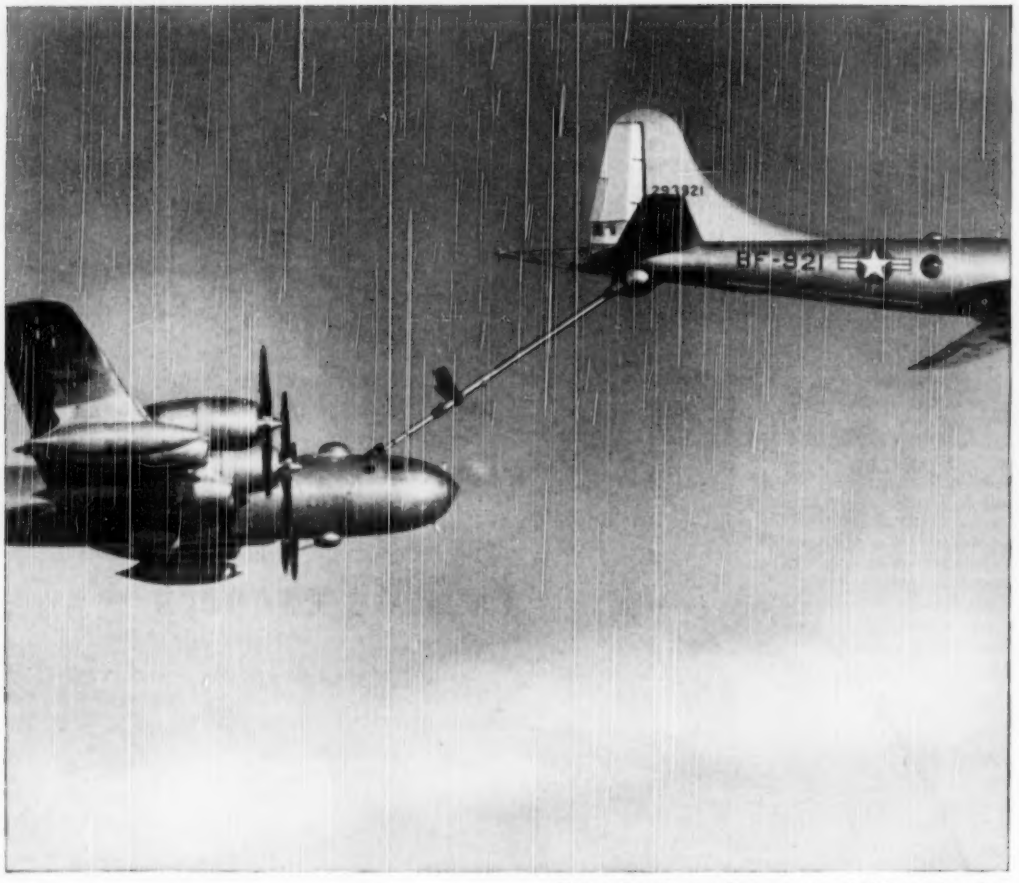


SKF

BALL AND ROLLER BEARINGS

Pioneers of the Deep Groove Ball Bearing – Spherical Roller Bearing – Self-Aligning Ball Bearing



With airplane-like controls, operator in tail of B-29 tanker "flies" telescoping gasoline boom into slot on nose of B-50 receiver plane.

Gas station in the sky!

The idea of flying gas stations was a popular joke during aviation's early days. Today, it is a reality which Boeing, in co-operation with the U. S. Air Force, has brought to a high state of development with the "flying boom" for refueling airplanes in flight.

Proved practical in actual test flights, the Boeing boom greatly extends the range of bombers such as the great new Boeing B-50 Superfortress. It makes possible fast, safe refueling of planes at high altitudes, over the weather and out of range of interceptors.

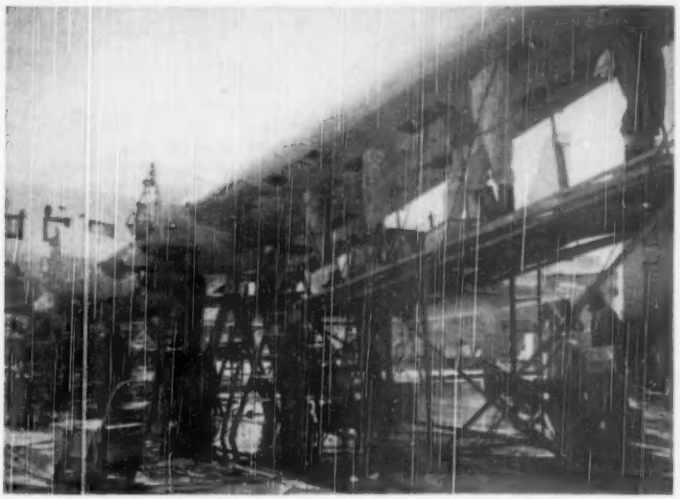
Details are still secret. But the Boeing boom is far advanced over the method used to refuel the Air Force Superfortress "Lucky Lady II" when it flew non stop around the world last year.

The job of designing and manufacturing a successful refueling device was tackled with characteristic Boeing thoroughness. Designers, engineers and mechanics worked night and day as a well-coordinated team, compressing years of painstaking effort into months.

They dedicated to the task the same imagination in design and engineering, the same production skills and capacities that go into all Boeing products. "Built by Boeing it's bound to lead."

Built by Boeing for the U. S. Air Force are the new B-47 Stratojet bombers, B-50 Superfortresses and C-97 Stratofreighters; for the Army, the L-15 Scout liaison planes; and for five of the world's leading airlines, the twin-deck Boeing Stratocruisers.

BOEING



MESSY JOB: tank stripping and cleaning, is made easier with new bond release compound.

Easier Way to Strip Fuel Tanks

New Turco method breaks bond holding sealant to tank, permitting simple peeling of lining from the wall.

A novel and practical approach to the vexing problem of stripping integral fuel tanks has been undertaken by Turco Products, Inc.

The company has recently put on the market two allied products, Turco 2822 thick and Turco 2822 thin, which strip the sealant from fuel tanks on the bond release rather than on the dissolving principle. Already in use by Lockheed Aircraft Service, Spartan Aircraft and Northwest Airlines, Turco claims that it reduces man hours by as much as 50 percent.

The vast majority of aircraft flying today are equipped with integral fuel tanks. The large variety of sealants used in these tanks (often several types are used in one tank) can be generally classified in three categories:

- **Thiokol Type**—Such as proseal 354, EC-801, TC-46.
- **Neoprene Type**—Such as TC-48, EC-776.
- **Zinc Chromate**—Putty type, such as RL-2700.

As time accumulates on the aircraft, leaks develop in the tanks. Some sort of repair method had to be developed. Patching proved to be satisfactory at first, but it was obvious that there was a limit to the number of times a tank could be patched.

The problem, then, was to create a material which would completely remove a sealant and leave the tank clean enough to be resealed. The task was complicated by the number of sealing materials involved and by complex tank structures.

▶ **Two Methods**—There are two schools of thought concerning the most effective method of stripping tanks:

- "**Fill and Drain**" procedure.
- **Spray-on** method.

Both methods have their advantages. The former requires fewer man hours, the latter less material and equipment.

In either case, existing types of strippers dissolve the sealants in the tank but pose many problems.

In the case of fill and drain, the stripper has to be run through the tank many times in order to dissolve away all the sealant and different strippers have to be used for various sealants. And when most of the sealants have been removed, a thick residue often is left on the floor of the tank. This contaminates the unsealing material so quickly that it has to be changed frequently. If not washed out immediately, the residue will re-adhere.

This residue usually is difficult to wash out and in many cases requires the application of an emulsifying agent to make it water-rinsable enough.

▶ **Protection Needed**—Many of the same problems exist with the spray-on method, which has the added disadvantage of requiring complete protection for the workmen while in the tank (Polyethylene plastic-coated hoods and respirators). All older types of strippers have very disagreeable odors and dangerous toxicity characteristics.

Turco realized that dissolving-type strippers, however effective, would always be costly and cumbersome to use. Turco, working with Lockheed Aircraft Service, near its own headquarters at 6135 S. Central Ave., Los Angeles, got to the kernel of the unsealing problem. The answer was a material which would release the bond between the sealant and the tank surface.

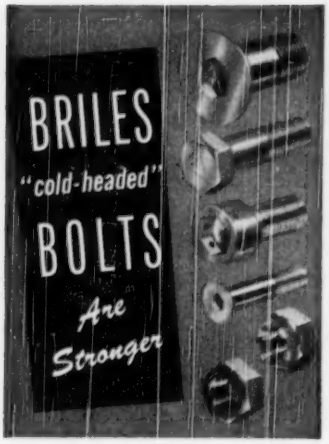
Advantages of this method of stripping are:

- **Since sealant is not dissolved**—The stripper is only slightly contaminated and may be re-used many more times than dissolving type. (Tests indicate 20 re-uses possible with addition of normal amount of make-up to replace lost fluid.) Thus total cost of stripping is greatly reduced since less stripper is required.
- **The bond-release**—Stripper peals off sealant in large pieces, leaving the tank so clean that only a water rinse and solvent wash-down are required.
- **The material does not have**—To be rinsed out immediately, as in other methods. It continues to work until washed out and does not possess undesirable re-adhering qualities.
- **The Stripper**—Will not support combustion, and its toxicity is reasonable.
- **Effectiveness on all types**—Of sealant has been proved to date.

Its bond-release action holds true only with synthetic (thiokol or neoprene) rubber sealants, zinc chromate putty types are dissolved. Only one type of stripper need be stocked.

In addition to these mechanical and application assets, Turco claims that not only are the man hour requirements for stripping cut by 50 percent, but also the total immobilization of the aircraft is greatly reduced. Although the "dwell time" for the new material is about the same as for the dissolving type, one fill and drain (plus a little local touch up with thick material to remove stubborn pieces) normally suffices.

Turco products bond-release strippers, Turco 2822 thick (for spray on application) and 2822 thin (for fill and drain) are comparable in price to the dissolving-type unsealers. Being perfectly miscible, they may be mixed to obtain any desired consistency; moreover,



You can count on Briles Bolts for extra strength & longer life

The chrome 'molly' steel stock is **cold-headed.** The grain of the stock follows the shape of the bolt head, rather than running vertically through it. After heat treating, the threads are **rolled on,** forcing the grain to conform to the thread shape as well—giving both bolt head and thread extra granular strength, better wearing qualities.

You can bank on Briles quality of material and workmanship too—always. From the raw bar stock to the finished A.N. and N.A.S. standard bolt or nut, Briles precision methods and scrupulous inspection plus material control, assure the highest standard of constant quality.

Aircraft Purchasing Agents
You Can Purchase Briles Bolts & Nuts
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All types of Aircraft Fasteners to your specifications. Cold-Headed Bolts from 3/16" to 1" diam.

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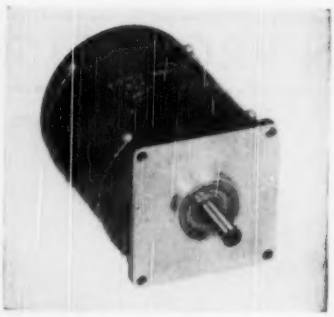

Actuator Motors

Line of intermittent and continuous duty 400c. motors with ratings from 1/7 to 2 hp. are offered by **Lear, Inc.,** 110 Ionia Ave., N.W., Grand Rapids, Mich.

These single-phase, 115v., and 3-phase, 200v. units are represented to have operating efficiencies as high as 73 percent. They also feature high ratio of power output to unit weight. Weights range from 2.1 to 5.2 lb. Lear already is using them to power its rotary and linear actuators for controls, and jet engine inlet air actuators.

Motors are equipped with integrally constructed a.c. brakes to permit quick stopping of rotor and load. Four models available are Nos. 30A-22A-1, 30A-10B-2, 20B-20A-1 and 20A-20A-1.

Specifications for Model 30A-22A-1 (shown) are: 3-phase, 200v., 400c.; output, 2 hp.; speed, 10,900 rpm.; starting torque, 200 percent full load; duty cycle, 30 min. on., 30 min. off; dimensions, 5¼ in. long, 3⅛ in. o. d.; weight, 5.2 lb.

New Rectifier

For use in testing laboratories, production lines, for checking radio and other electrical equipment in aircraft, selenium rectifier has been developed by **Richardson-Allen Corp.,** 15 W. 20 St., New York, N. Y.

Unit is full wave, 6-phase. It delivers 24 to 32v.-d.c., 30-amp. current from 3-phase, 220v.-a.c., 60c. input. Output is continuously variable throughout 24-32v. range by rheostat control saturable reactor.

Regulation is ±4 percent from 0 to full load. Device has 1.5 percent d.c. ripple, is designed to operate in ambient temperature of 40 C. and is convection cooled. Response speed is 0.4 sec.

Voltmeter, ammeter, 6 ft. of 3-phase cord with locking plug, d.c. circuit breaker, a.c. fuses, on-off switch and pilot light are included in equipment. It is housed in aluminum alloy cabinet measuring 18 × 14 × 15 in., provided with carrying handles. Weight is 150 lb.

Heater Control

Duct thermostat designed for aircraft heater control is equipped with flexible cable for remote control point adjustment from cockpit or flight engine air station.

Made by **Barber-Colman Co.,** Rockford, Ill., this thermal sensing element maintains a constant control point with variations in air duct velocity. Standoff flange mounting eliminates variations in calibration with changes in air temperature. Maximum thermostat operating temperature is 450 F. and maximum range is 200 F. Standard control cable lengths are 4 and 8 ft. Electrical components are explosion-proof.

Potentiometer

Model P-2 electronic potentiometer is offered by **Southwestern Industrial Electronic Co.,** 2831 Post Oak Road, Houston. It makes precise potential measurements on high impedance electro-chemical cells or electronic tubes and circuits.

Instrument can be used for measuring from 0 to 3 volts in 3 ranges. Current flow in the measured circuit is less than 10^{-11} amp., making instrument suitable for use with glass electrodes.

Built-in standard cell, combined with 0.1 percent potentiometer and dual range dial, provides accuracy of ±(1 millivolt + 0.1 percent). Maker says unit can be used for precise pH measurements, having a comparative accuracy of 0.05 pH units.

(PHOTOGRAPH COURTESY OF PAN AMERICAN GRACE AIRWAYS)

A Good Sign to Fly to...

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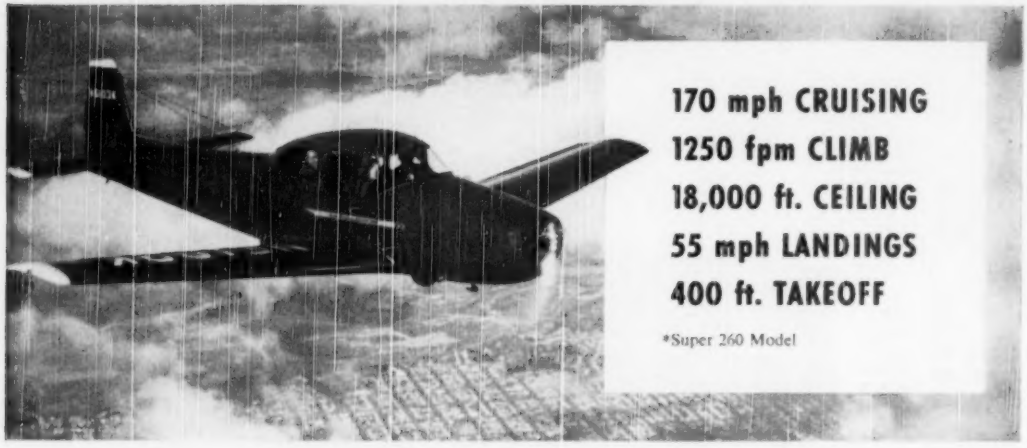

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West European Lines Talk Pool

KLM, Sabena, Swissair plan joint route operations in Europe; if it works, plan may be used over Atlantic.

Three of Europe's most successful air carriers are working out a cooperative deal that may heavily retouch the competitive picture across the North Atlantic.

At present, KLM Royal Dutch Airlines, Sabena, of Belgium, and Swissair are arranging for pooling of equipment and splitting routes and schedules on internal European services. If the plan works there, it would be logical to extend it to North Atlantic services, which all three lines operate.

This could mean, in effect, a Western European combine for trans-Atlantic service resembling that of the Scandinavian countries. Scandinavian Airlines system (SAS) is controlled by the carriers of Norway (DNL), Sweden (SILA, then ABA) and Denmark (DDL). By participation in SAS, these three lines can compete over the Atlantic with the much bigger U.S. and British carriers–something they couldn't hope to do individually.

▶**United Front**–The SAS arrangement worked so well over the Atlantic that two years ago the carriers of Norway, Sweden and Denmark extended it to their European systems. Now all planes of DNL, DDL and ABA are marked SAS, although each company retains its corporate identity and participates in the profits. This "United Front" against competition is cheaper both administratively and operationally.

Foreign lines have been steadily increasing their share of the North Atlantic business. In the first quarter of this year they carried about 35 percent of the traffic, against 29 percent in the same period a year ago. If KLM, Sabena and Swissair were now to pool their promotion and sales, they could offer an attractive "package" across the ocean, particularly in view of the linked European internal services.

The combine proposal is too new for other trans-Atlantic carriers to have firm ideas of its result. But speculation runs that not only U.S.-flag lines, but other foreign carriers would feel the effects.

▶**In Union Is Strength**–U.S. lines would find three former competitors whittled down to one–but that one would be in a far better position to match the U.S. carriers' promotional advertising and sales budgets. Then, too, the pooled aircraft of KLM, Sabena and Swissair would give the combine enough equipment to handle peak loads. In the past, because they had available equipment, U.S. carriers have gotten some business that normally would have gone to foreign lines. Another aspect being considered is that the joint line would be drawing on the national pride of three countries, instead of that feeling being split among three companies.

The cooperative plan originated with KLM and details have been under consideration for six months, lately in Zurich, Switzerland. Already, KLM and Sabena reportedly are pooling servicing facilities at airports they each serve. Tentatively, other parts of the arrangement would be:

• **Pooling of aircraft** of the three lines. Nearly 150 planes would be available and each company would have the right to use the planes according to its need.

• **Joint scheduling** of European flights that now are competitive. Avio Linee Italiane (ALI), of Italy, and SAS have been brought in on this. Already, schedules have been arranged so that the carriers will make flights on different days over these routes: Paris-Brussels-Amsterdam-Oslo-Stockholm (KLM, Sabena and SAS); Brussels-Milan (Sabena, KLM and ALI); Brussels-Zurich (Sabena and Swissair); and all over Germany (Sabena, KLM).

▶**Economy move** need for economizing spawned the plan. And for this reason it attracts Swissair (overtures also have been made to SAS and Air France). The Swiss carrier, a privately owned company, until this year was probably the only unsubsidized airline in Europe. It made a profit in 1946, more than four times as much in 1947 (about $250,000), then dropped below the 1946 level in 1948. Last year it turned in a $1-million loss. It estimates a $2.5-million loss this year and has asked the Swiss government to make it up.

Competition with government-aided European lines did part of the damage to Swissair. Its unpressurized DC-4s on the North Atlantic run lost passengers to the pressurized planes of its competitors. But the stiffest blow of all was devaluation. Switzerland did not devalue its currency. Result was an automatic rise in fares when paid for in Swiss Francs or their equivalent.

CENTRAL RECORDS FIRST MILLION MILES

For flying one million miles of scheduled air carrier operations with its fleet of 11 Beech Bonanzas, Central Airlines recently was awarded a special certificate by Beech Aircraft. Pictured from left to right: Bud Lawless, Central's Wichita agent; Frank E. Hedrick, Beech vp-coordinator; Robert E. Harding, Jr., Central vp-operations; Allen S. Maesstre, Central agency and interline sales manager, and Beech chief service engineer Paul E. Allen. In the first eight months of operation, Central has flown 3063 scheduled flights and carried 3323 passengers over its 1320 route-miles without incident. In addition the Bonanzas have hauled more than 152,193 lb. of mail and cargo.

Average Aircraft Stopping Distances

(Ground roll distance in feet from point of touch down to stop)

Plane	Maximum Weight (lb.)	Touch Down Speed (Average mph.)	Brakes only, ft.	Reverse props only ft.	Emergency stop: Full brakes & props, ft.
Convair-Liner	41,000	100	1500-1700	1500-1700	1000
Curtiss C-46	45,000	90	2500-3000	1800-2000	900
DC-6	87,000	100	1500-1700	1400-1600	1000
Constellation	92,000	100	1600-1700	1500-1600	1000

Source: ALPA.

Reverse Thrust Scrap Flares Anew

CAB disputes ALPA claims on safety value of reverse-thrust propellers; cost figures are also challenged.

The Air Line Pilots Assn. is scrapping again with the Civil Aeronautics Board over safety and economic aspects of reverse-thrust propellers.

Last February, in testimony on behalf of independent Air Safety Board legislation, ALPA President David L. Behncke charged that one of CAB's worst blunders in safety regulation was its failure to require installation of reversible props on all airline transports. Then last week, in a statement before a House Interstate and Foreign Commerce subcommittee, Behncke emphasized that fatalities and property damage resulting from "overshoot" accidents could have been eliminated or minimized by taking the precaution to use reversible propellers.

▶**TWA Crash Report**—CAB, which opposes establishment of an independent Air Safety Board, issued an accident report on one of the mishaps ALPA believes could have been avoided. CAB's findings rubbed salt into Behncke's sore spots by blaming the crew for the crash.

The controversial mishap involves a TWA Model L-49 Constellation which failed to stop on the runway during a landing at Chicago Municipal Airport last Dec. 18. The craft went through the airport boundary fence, striking a billboard and stone pillar before coming to rest in Cicero Ave., near one of Chicago's busiest intersections.

Only one passenger was injured. But the plane suffered extensive damage.

▶**Cause of Mishap**—CAB said the probable cause of the accident was the pilot's execution of a final approach at an excessive air speed, and landing too far down the wet runway. The plane touched down about 3200 ft. from the approach end of the 5730-ft. strip, leaving only 2530 ft. of usable surface.

The landing followed an ILS approach with ceiling 300 ft., visibility 1¼ mi., unfavorable surface wind, and moderate fog and smoke. Subsequent tests revealed that the brakes and other vital equipment were operating normally.

The craft was not equipped with either reversible-pitch propellers or steerable nose wheel. Therein, Behncke contends, is the real cause of the crash.

▶**Stop Distances Studied**—ALPA says a 93,000-lb. Constellation touching down on a dry runway at 100 mph. can stop in 1600-1700 ft., with brakes only. With reverse props only it can stop in 1500-1600 ft., and with full brakes plus reverse props it can make an emergency stop in 1000 ft.

"Had the (TWA Connie) been equipped with reverse-thrust propellers it could have stopped without accident well within the confines of Chicago Midway Airport," Behncke asserted. ALPA points out that even if a plane cannot be stopped on the runway, the reduced speed resulting from reverse thrust will minimize impact damage and reduce the possibility of casualties.

CAB's report indicated that the TWA plane's landing speed was considerably faster than the normal 100 mph. at touch down. This threw doubt on the Connie's ability to stop on the remaining 2530 ft. of wet runway even with reversible props.

ALPA notes, however, that reverse thrust is most valuable on a wet runway. It says that the improved props can reduce stopping distance by about one-third on a dry surface, but the stopping distance is cut as much as 75 percent on a wet or icy runway where the brakes may prove ineffective.

▶**Need Increases**—During the past three years, airline planes equipped with reverse-thrust propellers have not had a single overshoot-type accident., ALPA states. "On the other hand, the list of overshoot accidents involving planes not so equipped grows steadily longer. The trend toward modifying older-type airline equipment for air coach service, with passenger loads increasing from 44 to as much as 70, intensifies the need for reverse thrust."

ALPA emphasizes that reverse thrust provides insurance against brake failure. It tends to destroy lifting effect of the wing center-section and large portions of the wing itself. Thus, ALPA explains, it permits greater weight to bear down on the wheels, causing more friction between the tires and runway surfaces, necessary to insure safe landings.

While ALPA strongly endorses reversible-pitch propellers as an added safety factor to compensate for fast, heavy planes and wet, icy, rough or short runways, the union balks at permitting the device to be used for economic advantages. "Under no circumstances," ALPA declares, "should reversible-pitch propellers be permitted to reduce runway length requirements or increase takeoff gross load due to shorter start-stop distances possible with the installation."

▶**Damage High**—ALPA cites 23 U.S. airline accidents since September, 1945, which "might have been avoided with reversible propellers." The union says the first 13 of these resulted in 52 fatalities and $6,500,000 damage to aircraft. The last 15 of the 23 overshoot accidents came after ALPA recommended to CAB that reversible props be made standard equipment on all airline transports.

Behncke says the $6,500,000 loss in damaged planes would more than cover the cost of all reversible-pitch propeller installations. He estimates the new props can be installed on DC-3s for $35,000 per plane, while DC-4s and Constellations still flying without the device could be equipped for about $65,000 each.

▶**Conflicting Figures**—In sharp contrast, John M. Chamberlain, director of CAB's Bureau of Safety Regulation, told the House committee that it would cost $37,120,000 to equip all scheduled airline DC-4s and Connies with reversible props (AVIATION WEEK Apr. 10). Using manufacturers' figures, he said cost for 233 DC-4s would be $20,970,000 ($90,000 each), and for 64 Connies still lacking reverse thrust $16,150,000. Additionally, the airlines might lose revenue while the planes were out of service for modification.

Chamberlain believes using reverse thrust on DC-3s, with their nontricycle-type landing gear, may be entirely impractical and even unsafe. Besides, he declared, Douglas Aircraft Co. estimated it would cost $23,052,000 ($51,000 each) to equip the scheduled airlines' 452 DC-3s.

CAB officials point out an inconsistency in Behncke's cost estimates. ALPA contends the total cost for equipping the airline fleet would be "no more than $6,500,000." But the union's own unit cost figures, when multiplied by the planes affected, give a total expense of $35,125,000.

Parks Prepares to Activate Routes

Parks Air Lines, East St. Louis, Ill., is making arrangements to activate portions of its 4000-mi. midwestern feeder system.

Originally awarded to Parks by the Civil Aeronautics Board in 1946 and 1947, the short-haul system's inauguration has been delayed by financial and other difficulties. As a result, CAB in June, 1949, instituted an investigation to determine what disposition should be made of the routes.

Less than two months ago, a CAB examiner recommended that the Parks feeder system be divided among Turner Airlines, Ozark Air Lines and Mid-Continent Airlines (AVIATION WEEK May 1).

▶**Two Links Ready**—Parks has disclosed plans to activate its Chicago-St. Louis link around June 18. It hopes to start Chicago-Sioux City service July 1. DC-3s have been acquired for the operation.

Like Turner Airlines, which finally began feeder service last fall after a long delay, Parks has obtained financial help from a non-scheduled operator. C. A. Bachman, president of Twentieth Century Air Lines, Charlotte, N. C., has pledged purchase of several hundred thousand dollars worth of Parks' stock, enough to give them a good start.

Northwest Nonskeds Have Their Troubles

Nonskeds flying between Seattle and Alaska are having trouble with their travel agents.

Many agents have been placing little business with these irregular carriers, probably for fear of offending their scheduled airline clients. Those who have continued to deal with the nonskeds have demanded an increase in ticket commissions to 20 percent from the previous ten percent.

▶**Holding a Club**—The nonskeds have refused. So the agencies started to carry out threats to bring in aircraft from other points to haul construction men to Alaska. The nonskeds retaliated by organizing the Arctic Travel Club. Upon payment of a $1 membership fee, the club secures flight passage to Anchorage for $52, and to Fairbanks for $64, compared to $72 and $130 fares received respectively on a scheduled plane.

The Arctic Travel Club divides its business among Air Transport Associates, Golden North Airways, Standard Air Cargo and Arnold Air Service. As soon as it enrolls 35 "members" for a given point, it dispatches a plane, in effect permitting the airlines to pool

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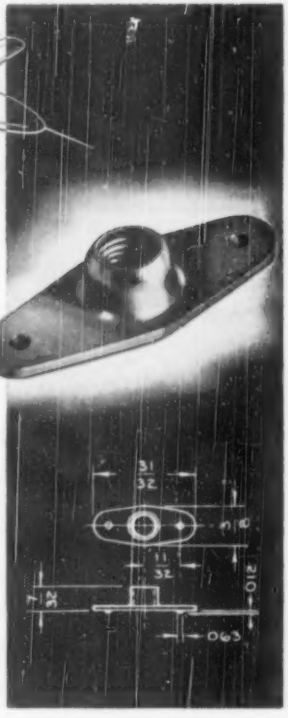

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the limited number of flights they are permitted.

Amos Heacock, president of ATA, said his company, with Golden North, Arnold and Transocean Airlines, had asked the CAB to investigate practices of the travel agencies and the out-of-town air carriers. He also inserted in the help wanted classified advertising columns of a Seattle daily newspaper a warning against flying to Alaska "for a job before you investigate."

Pan American and Northwest Airlines, scheduled operators into the Territory, meanwhile are carrying lots of passengers. PanAm carried four plane loads of machinists by May 16, and has charters for some 20 plane loads of fishermen.

The door closed on another group of potential nonsked customers when the Machinists Union signed a contract with the Alaska Salmon Industry, Inc., which provides that union members may be flown north only in scheduled airlines.

The Machinists are the first union to obtain such an agreement but other unions dealing with the cannery operators may follow suit.

Sierracin Passes Lockheed Tests

Sierracin, the new, non-crazing plastic material for aircraft windows, has been proven worthy of the confidence it originally held.

As a result of the recent failure of a Sierracin cabin window on a Model 049 Constellation (AVIATION WEEK Mar. 13), Lockheed has been conducting exhaustive tests to determine the exact cause of the rupture. The final results, as communicated to the Civil Aeronautic's Board, indicate that the failure was an isolated case due to causes unknown.

Since the pressure window (outer) of Model 649 and 749 Connies are ½-in. thick, Lockheed recommends that normal operations be resumed immediately with the present Lucite, Plexiglas, Aeroplastic or Sierracin windows.

Pressure windows on Model 049 Constellations are ⅜-in. acrylic (Lucite or Plexiglas) panes whose use is considered satisfactory for continued normal operations, provided no crazing exists; crazing of any sort is cause for replacement.

As an additional safety measure for Model 049s, Lockheed suggested that outer panels, which heretofore supported no stress, be replaced by ½-in. polyester (Sierracin) windows. Tests have indicated that the ½-in. Sierracin outer panel can safely withstand the sudden pressures applied should the inner window inadvertently fail with cabin pressures of 8 to 10 psi.; the maximum normal cabin pressure is under 7 psi.

Polyester outer windows are recommended instead of acrylic due to the former's resistance to crazing.

Lockheed feels that such an outer panel installation should increase safety of Model 049 window configuration a hundredfold.

SHORTLINES

► **Air America**—A CAB enforcement attorney has asked the Board to dismiss its charges against the carrier. One of the largest transcontinental nonskeds in 1948 and 1949, AA last January was ordered to show cause why its letter of registration shouldn't be revoked for knowing and willful violations of the Civil Aeronautics Act. The carrier stopped operations following the order and in March surrendered its letter of registration for cancellation. Company's application for an air coach certificate is still pending.

► **Alaska Airlines**—Reports $1,322,566 net loss on $4,503,047 operating revenues for the year ended last Oct. 31, compared with $152,439 profit on $3,532,558 operating revenue the previous fiscal year.

► **American Overseas**—Company Stratocruiser set a nonstop record of 11 hr. 37 min. on the 3107-mile run from Shannon, Eire, to New York.

▶ **American**—Handled 7347 passengers on its transcontinental DC-6 aircoach flights between Apr. 9, when service started, and May 18. Load factor was 87.5 percent. R.E.S. Deichler, AA vice president-sales, said the operation has created new business, and regular-fare transcontinental flights have not suffered.

▶ **Braniff**—During April carried 54 percent more international cargo than in any previous month. . . . Company inaugurated U.S.-Buenos Aires service last week. . . . Through the Institute of International Education, Braniff will provide free roundtrip air transportation each year for 25 Latin American students taking graduate work in the U.S. and 25 U.S. students studying in Latin American countries.

▶ **British European Airways**—Will order 25 Vickers Viscount Type 700 turboprop transports, designed to carry 40 passengers at 310 mph. cruising speed on such continental routes as London-Rome. First Viscount 700 is due to fly this summer. A smaller prototype Viscount has been flying since July, 1948. . . . BEA carried 751,512 passengers in the year ended March 31—a gain of 30 percent over the previous year.

▶ **BOAC**—Carried 49,478 revenue passengers in first-quarter 1950, against 34,944 in the same 1949 period. Mail and cargo traffic also gained.

▶ **California Central Airlines**—The Burbank-based operator has asked CAB for a certificate to carry persons and property (no mail) between San Francisco, Oakland, Los Angeles and San Diego. Since starting service in January, 1949, CCA has carried about 100,000 passengers on its intrastate Burbank-San Francisco link and over 8000 between Burbank and San Diego.

▶ **Central**—Has completed its first million miles of scheduled feeder operations with Beech Bonanzas. Since starting service last September, the carrier has handled 3323 passengers and 152,193 lb. of cargo and mail. It made nearly 20,000 landings and takeoffs on its 25-city system in Texas, Oklahoma and Kansas.

▶ **Frontier**—Officers of the new feeder, formed by merger of Challenger Airlines and Monarch Air Lines, are: H. S. Darr, president; C. A. Myhre, Donald Duff and R. M. Wilson, vice presidents; and Emil Levin, secretary. General offices of Frontier will be at Stapleton Field, Denver, where headquarters of Monarch and Challenger were located.

▶ **Los Angeles Airways**—Sikorsky S-51 helicopter delivered to LAA in August, 1947, has logged over 3000 hr. Two other S-51s have flown over 2500 hr.

▶ **Pan American**—Has started the first scheduled landplane service to Guadeloupe and Martinique to coincide with opening of new airports on the French West Indian Islands. The new stops are on PAA's Puerto Rico-Trinidad route. . . . PAA cleared all passenger backlogs to Europe with addition of a second daily flight to London on June 1. . . . Avco Manufacturing Co. has marketed its 366,954 shares of PAA. Avco was PAA's largest stockholder, owning 5.97 percent.

▶ **Philadelphia International Airport**—Contracts totaling $7,100,000 for a new terminal building have been awarded. Entire finger-type structure will be air conditioned. Passengers will be loaded directly from the second floor of the fingers to their planes by gangplanks.

▶ **Robinson**—Carried a record 4682 passengers in April and had a 99.6 percent completion factor. . . . The feeder has received a temporary exemption to serve Utica-Rome, N. Y.

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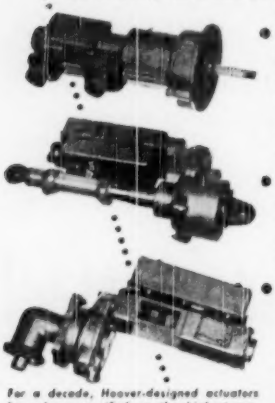

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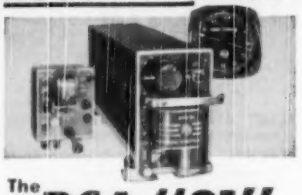

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▶ **Transocean**—Has been operating DC-4s between Panama and Rome via Caracas, Bermuda and the Azores on a weekly basis. Traffic includes many Holy Year pilgrims.

▶ **Trans-Pacific**—CAB has agreed to expedite action on the Hawaiian carrier's application to carry mail. Company concedes it is in poor financial condition, but President Ruddy Tongg has shelved plans to sell the carrier while fighting to whip it into sound financial shape.

▶ **TWA**—Set a 20-year traffic record on May 14, when 8500 passengers were handled on the company's domestic flights. From May 12-14, TWA flew 31 extra sections. . . . CAB has recently approved the carrier's purchase of six Model 049 Constellations from Hughes Tool Co.

▶ **United**—Employes on March 31 numbered 9477, down 620 from March, 1949.

▶ **U.S. Air-Coach**—The Long Beach Calif., nonsked has asked CAB for an exemption to engage in group charter passenger operations between the West Coast and Hawaii, the Philippines, Okinawa, Japan, Formosa, Australia and New Zealand, using DC-4s.

▶ **Western**—Has carried more than 100,000 passengers on its Los Angeles-San Francisco coach flights, which have been operating eight months.

CAB SCHEDULE

June 6—Prehearing conference on renewal of Frontier Airlines' feeder certificate and suspension of United Air Lines' authority to serve Rock Springs and Cheyenne, Wyo. Postponed from June 1. (Docket 4346)

June 8—Resumption of CAB's enforcement hearing involving Trans American Airways, Great Lakes Airlines, Golden Airways, Edward Ware Tabor and Sky Coach Airtravel, Inc. Postponed from June 5. (Docket 4161)

June 8—Hearing on CAB's investigation of unauthorized cargo operations by American Shippers, Inc. (Docket 4296)

June 12—Hearing on approval of Transocean Air Lines' agreements with Loftleider, h.f., and Trans-Asiatic, Ltd. (Docket 4344)

June 12—Oral argument on additional service to Puerto Rico. (Docket 2123 et al)

June 19—Hearing on CAB investigation of Northwest Airlines' tariff practices and uncertificated operations of Fly Freight, Inc., and Sterling Freightways. (Docket 4290)

June 26—Hearing in Florida-Bahamas service case. (Docket 2824 et al)

July 17—Hearing on Lehman Brothers' interlocking relationship—case involving partners of firm holding various airline directorships. (Docket 3605 et al)

Jan. 8, 1951—Hearing in Big Four mail rate case and CAB investigation of the carriers' economy and efficiency. (Docket 2849 et al)

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National-Northeast Merger Talk

Merger of National Airlines and Northeast Airlines became a faint possibility last month when each offered to buy out the other for cash.

National, which has just completed a highly profitable winter season, made the initial move in meetings with George Gardner, NEA president, and Floyd B. Odlum, Atlas Corp. president. Atlas Corp. owns 32 percent of Northeast's common stock and 96 percent of the carrier's preferred shares. But the Civil Aeronautics Board has ordered Atlas to release all but 3 percent of its NEA holdings by Oct. 23, 1950.

▶**Deal Rejected**—Northeast said its board of directors had considered and rejected President George T. Baker's offer to buy NEA's assets. At the same time, Northeast disclosed it had made a counter-offer to Baker whereby NEA would buy National's assets for cash or buy all, or up to two-thirds, of NAL's capital stock for cash or for NEA common stock. Deal would be subject to CAB approval.

Baker backed away from the NEA offer. "National is not for sale," he told AVIATION WEEK. "But we could add Northeast's system to National and operate it at a considerable saving in mail pay," Baker declared.

The NAL president indicated he had tried to buy only NEA's Boston-New York route, although he also made an offer for the whole Northeast system. The carriers connect at New York. Baker thinks that despite NEA's rejection, "the door is still open."

According to Baker, Northeast has been "on the block" for several years. The carrier has been in financial difficulty much of the postwar period.

▶**Systems Complementary**—NEA-National merger discussions are nothing new. Similar negotiations took place during the war. The two systems are complementary, NAL having its best traffic during the winter, while NEA's peak business is in the summer. During the past winter, National leased DC-4 equipment from Northeast.

CAB has been kept advised of the NAL-NEA discussions. The Board is heartily in favor of mergers—where they can be shown to benefit public interest.

CAB investigations to determine whether part or all of NAL and NEA should be merged with other carriers have been pending for more than a year. A proposed NEA-Capital Airlines merger (approved by a CAB examiner) was canceled by mutual agreement in 1947 after both carriers suffered financial reverses.

New York Nonstop

(McGraw-Hill World News)

London—Studies just completed by de Havilland and British Overseas Airways Corp. in conjunction with Flight Refueling Ltd. show that nonstop operation of the jet-powered de Havilland Comet, with a full passenger load of 48, is possible between London and New York, with one refueling in the air.

Westbound time would be seven hours; the return flight would take six hours.

Refueling would take place over Shannon or Gander.

Deliveries of production-line Comets to BOAC will begin early in 1951.

Seaboard & Western Continues Gains

Seaboard & Western Airlines, uncertificated trans-Atlantic freight carrier, is riding an upward traffic spiral as it enters its fourth year of operation.

During its first three years, S & W's DC-4s flew 6.5 million revenue pounds of freight 12,645,555 ton-miles and made 870 North Atlantic crossings. Traffic during the past 12 months was 21 percent ahead of the previous year and 96 percent above the carrier's first year of operation.

▶**Westbound Traffic Up**—Arthur V. Norden, vice-president and general manager, said the growing importance of westbound cargo from Europe to the U.S. was the most encouraging factor in S & W's business. Westbound flow was up 40 percent during the past year. U.S.-Italy traffic soared 170 percent.

Despite increased cost of fuel, materials and services, Seaboard & Western has made a 20-percent general reduction in freight tariffs during the past three years. The New York company's application for a certificate to conduct a demand-type operation to the European and Middle Eastern areas it now serves on an irregular basis is still pending before the Civil Aeronautics Board.

Safety Record

U. S. scheduled international airlines set a world safety mark and a world airlift record the past two years, CAB said.

In the two years ended Apr. 14, U. S.-flag lines flew nearly three million persons without a fatality. To achieve the three million mark, the carriers flew about four billion passenger-miles. U. S. flags are now certificated to operate 203,675 route-miles internationally and to serve 239 foreign points on all continents.

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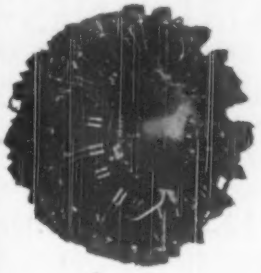

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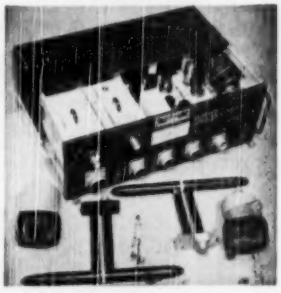

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EDITORIAL

The Feeders Should Organize

A feeder airline seminar was held the other day at the University of Oklahoma. The discussions proved again that the feeder lines have their own difficulties, that their trunk line brothers don't have now and never will have.

It appears to us that the problems of the trunk lines and the feeders are getting less alike every day.

Isn't it high time that the feeder airlines of the country band together in a strong association of their own to fight their own battles? They once had a rather weak promotional set-up called the Feeder Airlines Association. This was dissolved before it had a real chance to function because the members one by one joined the Air Transport Association as they won their certificates of convenience and necessity. A Feeder Airlines Committee of the ATA was announced when FAA died, but it has never done anything.

We think the feeders should belong to ATA, but they need their own virile organization, too, to conduct their own business and go to bat for their cause.

The Corporation and Bad News

The managing editor of Fortune magazine delivered himself of a speech before the Seventh National Conference of Business Public Relations Executives that deserved more publicity in industry than it got.

Ralph D. Paine, Jr., told the public relations chiefs (and we hope some aircraft company people were there) that he suspects no one yet fully understands the role of the modern public-owned corporation in society. It is a wholly new institution. It exerts an enormous force. It is run partly for the stockholders, partly for the government, partly for the consumer, partly for labor—not primarily for any one group.

"The health and the continuity of the corporation itself has become management's ultimate responsibility. The corporation is run for the corporation." That is Mr. Paine's contention.

"Some managements today, when thinking of the continuity of the corporation, have literally to think 50 to 100 years ahead. They conceive their ultimate responsibility as a responsibility to the corporation. They see the corporation as an institution in which the interest of many groups must be harmonized for mutual benefit—stockholders, labor, customers, suppliers, the national interest and that most formidable thing called public opinion."

If the modern corporation is so viewed, the function of a critical business press becomes clearer. To the executive who only has to worry about maximizing his profits and minimizing his losses, the critical business press has little interest. With some justification he can say to business paper editors, "My business is none of your business."

But not the modern corporation as it now evolves. That is everybody's business, and the management needs a freely critical press in the same sense that government needs a freely critical political press, Mr. Paine believes.

Whereas political journalism always finds someone who has a special interest in telling the "authoritative" story, business journalism is unique in that it appears seldom to anybody's interest to talk. "Bad news is exceedingly hard to come by while it is still fresh, particularly corporation news," Mr. Paine has noticed, along with some of the rest of us.

"Even competitors clam up when bad news is in the wind. One has to deal with a conspiracy of silence, a sort of we-are-all-in-the-same-club attitude," Mr. Paine points out. "I find this attitude hard to understand. If business men are all in the same club, then the club is surely suspect, for there are some pretty unattractive, if not dangerous, characters playing poker upstairs."

Business got in the doghouse originally because of the actions of a few particular rascals, not because of the actions of business men in general, the speaker recalls. "But do good business men, even anonymously, speak out against bad business men? No. Why not? I don't know. But if business is going in for club life, ordinary prudence, it seems to me, would dictate at least two clubs—a respectable club and one for the rascals."

Mr. Paine emphasizes that the problem is bad news, not just news. The publicists have made it increasingly easy to get good news. Usually, this is referred to as "legitimate" news; "legitimate" news might be defined as good news plus any bad news the law compels you to reveal, he says.

Then Mr. Paine let the publicity men have both barrels:

"It is your problem as well as mine. Because it is greatly to your interest, and thus to the interest of American business economy, to have a press that the people believe. The credibility of the press as it affects business is of the utmost importance. No small part of the popular revulsion against business in the 1930's was the result of the false impressions created by so much silly, uncritical, puffery that passed for business journalism in the Twenties.

"The picture we should strive to imprint upon the public is the picture of the American business economy as it really is, a true picture—like everything in life, partly good, partly bad, on balance much more good than bad, but certainly the best that man has yet devised for solving the age old problem of making a living."

The American temperament being what it is, normally optimistic and energetic, but extremely volatile, it is dangerous to overplay good news, to over-emphasize the success story, to mistake the spectacular for solid achievement, Mr. Paine warns. Certainly, the business press has been guilty of all these. We agree with Fortune's managing editor that there has been entirely too much press agentry both in business and in the business press. It has impaired the credibility of the press and it has done business more harm than good.

—Robert H. Wood.

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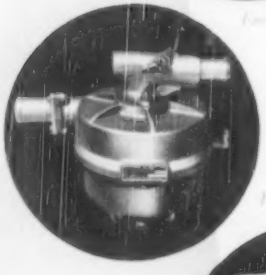

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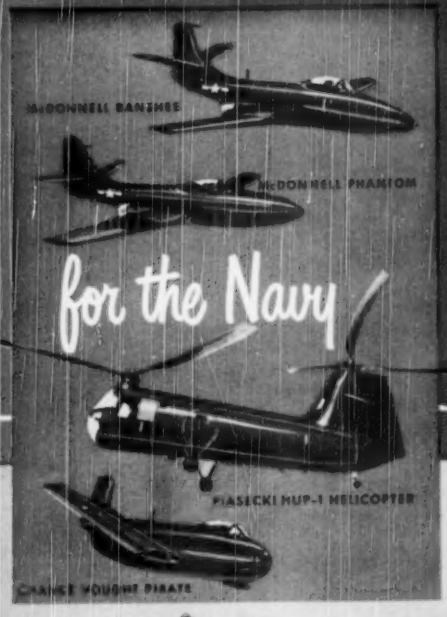
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